1.0 INTRODUCTION

This document has been prepared as an Addendum to the previously certified 1993 CalMat Cajon Creek Specific Plan (SP No. 90-01, et al.) Environmental Impact Report ("1993 EIR") and the 2020 Area Q Quarry EIR ("2020 EIR") as determined to be required by the County of San Bernardino (current Lead Agency) in accordance with California Environmental Quality Act ("CEQA") Guidelines §15164. The City of San Bernardino is acting as a Responsible Agency as respects to portions of the Project located within their boundaries.

Vulcan Materials Company – Western Division ("Vulcan") operates two separate and adjacent aggregate surface mining and processing operations in the City and County of San Bernardino. The existing Cajon Creek Quarry is located in the City of San Bernardino ("City"). The existing Area Q Quarry is located in the County of San Bernardino ("County"). In order to increase the efficiency of Vulcan's two mining operations, Vulcan plans to combine these two operations into one quarry with one Surface Mining and Reclamation Act of 1975 (SMARA) Reclamation Plan. The consolidation of the Cajon Creek Quarry with the Area Q Quarry is the Project subject to environmental review.

In 1993, the City approved the Cajon Creek Specific Plan ("Specific Plan"). The Specific Plan is a comprehensive planning and zoning document encompassing approximately 1,392 acres that authorized aggregate (sand and gravel) mining and related uses, industrial uses, and open space. The Specific Plan is divided into 16 individual planning areas denominated by letters (Area A through Area P). Figures 1 and 3 (Appendix A) show the locations of the Specific Plan planning areas that are relevant to the proposed Project.

The Specific Plan, along with associated permits, authorizes mining and processing operations at the Cajon Creek Quarry (comprising of Areas L, M, and N) on approximately 298 acres. The Specific Plan also authorizes light industrial uses on Area K, which are intended, among other things, to screen the eastern boundary of existing mining operations at the Cajon Creek Quarry. The City approved the Specific Plan after certifying the 1993 EIR.

Since 1993, the City has approved two development permit modifications governing the location of the processing plant at the Cajon Creek Quarry. There is no time limit on the entitlements granted under the Specific Plan nor specific limits on production. Yearly mineral production fluctuates between approximately 1.3 million and 3.1 million tons annually, based on market demand. The maximum achieved level of production has been 3.1 million tons per year.

In 2020, the County approved a zone change, use permit, and reclamation plan for mineral extraction in the area immediately south of the Cajon Creek Quarry known as "Area Q." As mineral production progresses at the Cajon Creek Quarry, Vulcan intends to mine in Area Q to provide additional materials for ongoing operations at the Cajon Creek Quarry. The County certified an EIR in 2020 for the Area Q project.

The Specific Plan areas (Areas K, L, M, and N) and Area Q are designated by the State of California as deposits of Regional Significance. In California, this designation is the highest form of recognition for the importance of aggregate deposits.

Vulcan, with this application, now seeks to make certain changes to operational characteristics under the Cajon Creek and Area Q entitlements. Vulcan's intent is to recover and use this regionally significant resource in a consolidated way to achieve operational efficiencies. For this reason, the current project is called the "Cajon Creek Consolidation Project" (hereinafter the "Project"). Vulcan proposes the following amendments to existing operations and entitlements:

1. Mining in Area K, currently designated for light industrial use, to a depth of 240 feet below ground surface ("bgs");
2. Mining in Areas L, M and Q to a depth of 240 feet bgs, an increase from the currently permitted 120 feet bgs;
3. Mining in the northern portion of Area N, currently designated for mineral processing, to a depth of 120 feet bgs, followed by mineral processing in Area N as Area M is mined to the 240-foot bgs depth; and
4. Mining the resources located between Areas K, L, and Q in one mining area, and M and N in another, creating two consolidated mining pits for efficient mineral resource recovery.

No other changes to the operation are proposed. The pace, nature, equipment used, and traffic generation/routes would not change.

In order to implement these Project amendments, Vulcan must amend certain existing entitlements from both the City and the County. These are:

1. Amendment to the Specific Plan's Design Guidelines governing mining depths and areas;
2. Amendment to City use permit and development permits issued under the Specific Plan;
3. Amendment to the County use permit; and
4. Combine and amend the two existing Reclamation Plans into a single consolidated and updated Amended Reclamation Plan.

In terms of processing this Project, the County will act as the lead agency for purposes of adopting the appropriate CEQA document. (Pub. Resources Code, § 21067; 14 Cal. Code Regs., § 15367.) The County will approve the entitlement amendments for lands within its jurisdiction and will thereafter act as the SMARA lead agency for reclamation plan compliance. (Pub. Resources Code, § 2728.) The City will, as a responsible agency, rely on the approved Addendum and be responsible for approving the entitlement amendments for activities within its jurisdiction.

As discussed below, the Project would not involve new significant environmental effects or result in a substantial increase in the severity of previously identified significant effects. Therefore, only minor technical changes or additions to the environmental analysis in the prior EIRs are necessary.

This Addendum now proceeds to analyze the changes contemplated by the Project under standards applicable to subsequent environmental review under CEQA.

1.1 CEQA STANDARDS

Once the environmental review process is complete, CEQA prohibits further environmental review of a project unless there are project changes that require additional discretionary approval proposed for the project. If a proposed project change triggers further CEQA review, a lead agency must determine whether those changes necessitate a "subsequent" EIR, "supplemental" EIR or "addendum" to the prior-approved EIR. A subsequent or supplemental EIR is required only where it is necessary to explore the environmental ramifications of a substantial change not considered in the original EIR. (Pub. Resources Code, § 21166; 14 Cal. Code Regs., § 15162.)

Whether and to what extent changes to an existing project require additional CEQA documentation is determined by comparing the potential impacts from proposed project changes to the analysis in the prior-certified EIR. CEQA requires a subsequent or supplemental EIR only where (1) substantial changes to a project, a substantial change in circumstances surrounding project, or new information about the project; (2) result in new significant impacts or more severe impacts that were not analyzed in the prior EIR; and (3) which would require major revisions to address. (Pub. Resources Code, § 21166; 14 Cal. Code Regs., § 15162.) Project changes that do not meet the above criteria may be addressed in an addendum, which is appropriate where "some changes or additions [to the prior CEQA document] are necessary but none of the conditions described in Section 15162 calling for preparation of a subsequent EIR have occurred." (14 Cal. Code Regs., § 15164.)

The Project, as discussed herein, does not involve any new significant environmental impacts or more severe environmental impacts that were not analyzed in the previous EIRs. As fully explained below, Vulcan proposes to continue operations consistent with the projects that were previously analyzed in the 1993 and 2020 EIRs, with some minor variation.

When a project will require discretionary approvals from more than one public agency, the CEQA Guidelines state that one public agency shall be responsible for preparing an EIR or negative declaration for the project (the "lead agency"). Each additional public agency that must provide discretionary approval for the project ("responsible agency") shall consider the lead agency's EIR or negative declaration prior to acting upon or approving the project and certify that it reviewed and considered the information. (14 Cal. Code Regs., § 15050.)

Here, the City and County have agreed that the County shall act as lead agency for both CEQA and SMARA purposes.[1] The City shall retain all other applicable discretionary and police power authority over the portions of the Project within its jurisdiction.

[1] When a surface mining operation with a single reclamation plan is within the jurisdiction of two or more public agencies one must act as the lead agency for carrying out responsibilities under SMARA. (See Pub. Resources Code, §§ 2728 [defining "lead agency"], 2771 [providing the State Mining & Geology Board authority to designate a lead agency in the event of a dispute between agencies].)

1.2 PRIOR EIRs

1.2.1 1993 EIR

The 1993 EIR[2] evaluated the potential environmental impacts associated with the Specific Plan. The Specific Plan is a comprehensive planning and zoning document covering approximately 1,392 acres that will be utilized for industrial development, sand and gravel recovery and related uses, and open space. The Specific Plan area is located within the northwesterly portion of the City within the Cajon Creek Wash, just west of Cajon Boulevard and approximately three-quarters of a mile south of the I-15/I-215 junction.

Relevant here, the 1993 EIR evaluated the potential environmental impacts of the Cajon Creek Quarry, which at the time was contemplated as an alluvial sand and gravel surface mining and processing operation on Areas L, M, and N. The Cajon Creek Quarry encompasses approximately 298 acres. The 1993 EIR evaluated the following activities:

- Resource recovery on 228 acres within Areas L and M, and mineral processing on the 70-acre Area N.
- Mining to a depth of 120 feet bgs.
- Final reclaimed slopes at a 2:1 (horizontal:vertical) configuration.
- Processing activities at Area N which included a 1,000-ton-per-hour aggregate plant, a ready-mixed concrete plant, an asphaltic concrete plant, cement-treated base plant, Portland cement concrete and asphaltic concrete re-crush operations, and other similar and related facilities.
- Typical surface aggregate operations which do not require blasting.
- Use of mobile equipment (excavator, loaders, dozers, etc.) to transport mineral resources from Areas L and M to the primary crusher and then to Area N for processing via an electrified conveyor.
- Finished products transported to market by trucks via the entrance on Institution Road, immediately north of Area M.
- Excess materials, including topsoil, overburden, and fines sold or used as fill during reclamation.
- Importation of inert fill to be recycled/resold or used as fill during reclamation.
- Use of settling ponds to capture/re-circulate process water.
- Reclamation following the completion of the mining activities with some reclamation occurring concurrently with mining and processing activities.

The 1993 EIR evaluated development within Areas L, M, and N using a phasing plan over a 25-year period that was divided into three periods: “Near Term,” “Intermediate Term,” and “Long

[2] The 1993 EIR is comprised of two separate documents, a Draft EIR that was released for public comment in December 1991 (“Draft 1993 EIR”) and a Final EIR that was certified by the City of San Bernardino in October 1993 (“Final 1993 EIR”). These documents are referred to collectively as the “1993 EIR,” however, specific references will made to each document for citation purposes. Required CEQA findings associated with the Final 1993 EIR are contained in the City’s Resolution Certifying the Final 1993 EIR.

Term." In the near term, Areas L and M were evaluated as a "Construction Material Users Park" During the intermediate term, Areas L and M were evaluated mineral resource extraction and Area N for aggregate processing. Lastly, during the long term, Areas L and M were evaluated for "Light Industrial / Construction Material Users Park – Redevelopment" following completion of mining and reclamation.

The 1993 EIR also evaluated buffer light industrial development on Area K. Area K is located immediately east of Area L, south of the Metropolitan Water District and San Gabriel Valley Municipal Water district aqueducts, north of the Devil Creek Diversion Channel, and fronts Cajon Boulevard on the west for a distance of approximately 0.8 miles. Area K was proposed to be subdivided into 18 lots (Lots 1 through 18) encompassing approximately 34.1 acres for light industrial uses on an approximately 36-acre parcel. Light industrial uses were expected to consist of free-standing buildings of 10,000 to 40,000 square feet for uses including business equipment sales and services, manufacturing, wholesaling, and distribution.

The 1993 EIR evaluated Area K's "Near Term" use as "Buffer Development - Light Industrial," with no change during the "Intermediate Term" or "Long Term."

The City prepared the 1993 EIR to evaluate environmental impacts associated with the following issues:

- Biological Resources (habitat loss and endangered species)
- Air Quality (dust from mining, processing, and wind events, vehicular emissions, and stationary source emissions)
- Geologic and Geotechnical (ground ruptures associated with seismic activity, groundwater impacts, and slope instability)
- Hydrology (flood hazards, drainage of surface runoff, sediment movement, and degradation of surface water quality)
- Noise (mineral resource processing)
- Land Use (conversion of State-designated regional significant resource land to other uses)
- Traffic and Circulation (increase in Average Daily Trips and an increase in truck traffic)
- Visual Resources (alteration of visual character, landform alterations, and light and glare)
- Hazardous Materials (onsite handling of hazardous materials)
- Public Services and Utilities (increased water and wastewater demand and pipeline relocation)

Conclusions from the 1993 EIR regarding environmental impacts are listed below. The information is presented here as a basis for comparison with the Project that is addressed by this Addendum.

- The 1993project was determined to have avoided impacts and/or mitigated impacts to an "insignificant" level in the areas of:

- Geologic and Geotechnical with mitigation;
- Hydrology with mitigation;
- Noise with mitigation;
- Traffic and Circulation with mitigation;
- Visual Resources with mitigation;
- Hazardous Material with mitigation; and
- Public Services and Utilities with mitigation;

- Significant unavoidable adverse impacts were overridden for specific impacts in the areas of:
  - Biological Resources;
  - Air Quality; and
  - Land Use

A statement of overriding considerations was adopted for the project's significant and unavoidable effects on endangered species and significant and unavoidable effects on air quality relative to dust and cumulative regional air quality degradation. A statement of overriding considerations was also adopted for the land use impacts associated with the conversion of approximately 124 acres of designated regionally significant mineral resource land to industrial uses and open space. (Final 1993 EIR, pgs. 7-39.)

1.2.2 2020 EIR

The 2020 EIR[3] evaluated the Area Q Quarry, a 196-acre mineral resource extraction area located immediately south of the Cajon Creek Quarry within the County's jurisdiction. Area Q provides additional mineral reserves for Vulcan's existing Cajon Creek operation. Once reserves are exhausted at the Cajon Creek Quarry, Vulcan proposed to relocate the mining operation into Area Q to allow for the continuation of the existing operation. The 2020 project did not involve any substantial change to the nature or pace of Vulcan's operations.

The 2020 EIR evaluated the following project activities:

- Resource recovery within 187.6 acres of the 196-acre site, with the remaining 5.5 acres dedicated to setbacks.
- The construction of an approximately 10-foot-tall earthen landscaped berm along the southern boundary.
- Mining to a depth of 120-feet bgs, with final reclaimed slopes left at a 2:1 (h:v) configuration.

[3] The 2020 EIR is comprised of a Draft EIR that was released for public comment in June 2020 ("Draft 2020 EIR") and a Final EIR that was certified in August 2020 ("Final 2020 EIR"). These documents are referred to collectively as the "2020 EIR," however, specific references will made to each document for citation purposes.

- Aggregate transferred via an extension of the existing conveyor in place at Area L. From there, material processing occurred in the same manner as done at the Cajon Creek Quarry, with no haul trucks entering ono or exiting the Area Q site via public roadways.

The 2020 EIR was prepared to evaluate the environmental resource areas identified in the CEQA Appendix G Environmental Checklist, which included the following areas:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Tribal Cultural Resources
- Wildfire

Other environmental topics included in the Appendix G checklist not listed above were also evaluated and it was determined that there would be no impact, and were therefore not carried into the detailed evaluation within the 2020 EIR.

Conclusions from the 2020 EIR regarding environmental impacts are listed below. The information is presented here as a basis for comparison with the Project that is addressed by this Addendum.

- The Area Q project was analyzed as a continuation of existing operations against the baseline conditions at the Cajon Creek Quarry and was determined to have avoided impacts and/or mitigated impacts to an "insignificant" level in the areas of:
    - Aesthetics
    - Air Quality
    - Biological Resources with mitigation;
    - Cultural Resources with mitigation;
    - Geologic and Soils with mitigation;
    - Greenhouse Gas Emissions
    - Hazards and Hazardous Materials
    - Hydrology and Water Quality;
    - Land Use and Planning;
    - Noise with mitigation;
    - Tribal Cultural Resources with mitigation; and
    - Wildfire.

- No significant unavoidable adverse impacts were identified.

  (Final 2020 EIR, pg. 1-7.)

1.3 CURRENT PROJECT UNDER REVIEW

The activities evaluated in the 1993 and 2020 EIRs (described above) currently occur and are permitted as part of the ongoing operations at the Cajon Creek and Area Q Quarries. A map showing existing operations is attached as Figure 1. Vulcan has submitted applications to the City and County to consolidate the separate operations into a single surface mining operation governed by one updated reclamation plan. As noted above, the Project seeks to amend the existing entitlements to allow the following:

1. Mining in Area K, currently designated for light industrial use, to a depth of 240 feet bgs;
2. Mining in Areas L, M and Q to a depth of 240 feet bgs, an increase from the currently permitted 120 feet bgs;
3. Mining in the northern portion of Area N, currently designated for mineral processing, to a depth of 120 feet bgs, followed by mineral processing in Area N as Area M is mined to the 240-foot bgs depth; and
4. Mining the resources between Areas K, L, and Q in one mining area, and M and N in another, creating two consolidated mining pits for efficient mineral resource recovery and post-mining land reclamation.

The Project would augment the existing individual mining footprints, as it would include portions of Area K and Area N, which were not previously planned for mineral resource extraction. Area N was identified for processing operations and Area K for light industrial use. The mining footprint would also include areas between Areas K, L, Q, and between Areas M and N to create two consolidated mining pits. The Project does not propose any other changes to the operating conditions. Specifically, the pace, nature, equipment used, and traffic generation/routes would not change.

1.3.1 Project Location

The Project is located in the northwest portion of the City of San Bernardino and the County of San Bernardino. Cajon Boulevard forms the eastern boundary, and Interstate 215 (I-215) is approximately ¼-mile to the east. Access to I-215 is via Institution Road, which is located immediately north of the quarry. The unincorporated urban community of Muscoy is located to the south of the Project site. Approximately 10-foot tall earthen berms located along the southeast boundary of Area Q and the eastern boundary of Area K shield the Cajon Creek and Area Q Quarries from public view. The Cajon Wash is located to the west of the Project site. The area north of the Project site is occupied by industrial developments.

1.4 IMPACT EVALUATION FORMAT

CEQA's "subsequent review" standards apply when a project proponent proposes substantial changes to a project that has already undergone CEQA review. (Pub. Resources Code, § 21166; see *Melom v. City of Madera* (2010) 183 Cal.App.4th 41, 48-49.) CEQA's "subsequent review"

standards provide that, once the environmental review process is complete, further environmental review of a project is prohibited unless substantial changes that require additional discretionary approval are proposed for the project. (Pub. Resources Code, § 21166.) If a proposed project change triggers further CEQA review, a lead agency must determine whether those changes necessitate a "subsequent" EIR, "supplemental" EIR or "addendum" to the prior approved EIR. (*Ibid*.; 14 Cal. Code Regs., §§ 15162-15164.) Courts have also held that subsequent review can be documented via a subsequent negative declaration or mitigated negative declaration.

Whether and to what extent changes to an existing project require additional CEQA documentation is determined by comparing the potential impacts from proposed project changes to the analysis in the prior-certified EIR(s). CEQA requires a subsequent or supplemental EIR only where (1) substantial changes to a project, a substantial change in circumstances surrounding a project, or new information about the project; (2) result in new significant impacts or more severe impacts that were not analyzed in the prior EIR; and (3) which would require major revisions to address. (Pub. Resources Code, § 21166; 14 Cal. Code Regs., § 15162; see also *City of Irvine v. County of Orange* (2015) 238 Cal.App.4th 526, 539-540; *A Local & Regional Monitor v. City of Los Angeles* (1993) 12 Cal.App.4th 1773, 1802-1804.) Importantly, only the incremental difference in environmental impacts between the approved project and the proposed project must be evaluated within the above framework.

Chapter 3.0 of this Addendum contains an evaluation of whether the Project would result in new significant environmental impacts or more severe environmental impacts that were not addressed in the prior EIRs.

Finding that this Project does not result in any new significant environmental impacts or more severe environmental impacts that were not addressed in the prior EIRs, this Addendum contains minor changes and additions necessary to make the previously certified EIRs adequate.

2.0 PROJECT DESCRIPTION

Vulcan operates two separate and adjacent surface mining and processing operations in the City and County of San Bernardino. The existing Cajon Creek Quarry is located in the City. The existing Area Q Quarry is located in the County.

Vulcan has submitted applications to the City and County that propose to consolidate the Cajon Creek Quarry and the Area Q Quarry into a one surface mining operation governed under a single modern reclamation plan. The City and County have agreed that the County will be the lead agency for CEQA and SMARA purposes. Vulcan's intent is to recover and use regionally significant mineral resources in a consolidated way to achieve efficiencies. As discussed above, Vulcan proposes the following amendments to existing operations and entitlements:

1. Mining in Area K, currently designated for light industrial use, to a depth of 240 feet bgs;
2. Mining in Areas L, M and Q to a depth of 240 feet bgs, an increase from the currently permitted 120 feet bgs;
3. Mining in the northern portion of Area N, currently designated for mineral processing, to a depth of 120 feet bgs, followed by mineral processing in Area N as Area M is mined to the 240-foot bgs depth; and
4. Mining the resources between Areas K, L, and Q in one mining area, and M and N in another, creating two consolidated quarries for efficient mineral resource recovery.

Refer to Figure 2, which shows these proposed permit conditions. Please note, no other changes to the operation are proposed. The pace, nature, equipment used, and traffic generation/routes would not change.

In order to implement these Project amendments, Vulcan must amend certain existing entitlements from both the City and the County. These are:

1. Amendment to the Specific Plan's Design Guidelines governing mining depths and areas;
2. Amendment to City use permit and development permits issued under the Specific Plan;
3. Amendment to the County use permit; and
4. Adoption of an amended reclamation plan for the Project covering both City and County land.

Section 2.1 provides an overview and background of each existing mining operation before discussing the proposed Project in detail.

2.1 Background of the Previous Mining Operations

2.1.1 Background – Cajon Creek Quarry

The Specific Plan is a comprehensive planning and zoning document covering approximately 1,392 acres in the northwest portion of the City. The Specific Plan authorized sand and gravel mining and related uses, industrial uses, and open space within the plan area. The Specific Plan is divided into 16 individual planning areas denominated by letters (Area A through Area P).

The Specific Plan, along with Conditional Use Permit No. 91-31 ("CUP 91-31"), authorize mining and processing operations at the Cajon Creek Quarry (comprising of Areas L, M, and N), on approximately 298 acres.

The Specific Plan also identified Area K for light industrial uses, which were intended, among other things, to screen the eastern boundary of Vulcan's mining operations at the Cajon Creek Quarry.

The City approved the Specific Plan and CUP 91-31 after certifying the 1993 EIR.

In 1998, the City approved Development Permit (Type II) No. 97-24 ("DP 97-24") to provide design review before Vulcan commenced operations, as required by the Specific Plan and CUP 91-31. Together, these entitlements permit resource recovery on 228 acres within Areas L and M, with mineral processing occurring within the 70-acre Area N.

Mining was permitted to be conducted at Areas L and M to a depth of 120 feet bgs. Final reclaimed slopes were approved to be left at a 2:1 (horizontal:vertical) configuration. Processing activities at Area N included a 1,000-ton-per-hour aggregate plant, a ready-mixed concrete plant, an asphaltic concrete plant, cement-treated base plant, Portland cement concrete and asphaltic concrete plant, cement treated base plant, Portland cement concrete and asphaltic concrete re-crush plant and other similar and related facilities. DP 97-24 allows, however, Vulcan to transport material mined from the Cajon Creek Quarry to a nearby Vulcan owned processing facility located on Highland Avenue, approximately two miles south of Area N via an existing access road, until permanent processing facilities are constructed at the Cajon Creek Quarry.

The evaluated permitted mining operations were/are typical of surface aggregate operations. Blasting was not evaluated since it was not part of the mining operations. The EIR evaluated the transportation of the mineral resources recovered from Areas L and M to a primary crusher and then to Area N for processing using a conveyor. It also evaluated the transportation of the finished products offsite to market by trucks using an entrance on Institution Road, immediately north of Area M. Excess materials, including overburden soils, rock types not considered saleable materials, and natural fines washed from the aggregates used in concrete products, would be sold or used as fill during reclamation.

There is no time limit on the Cajon Creek entitlements nor specific limits on production. Yearly mineral production ranges between 1.3 million and 3.1 million tons, based on market demand. The maximum historical level of production has been 3.1 million tons per year.

The Cajon Creek reclamation plan calls for Areas L and M to be reclaimed at a 2:1 slope ratio and revegetated following completion of mining; however, some reclamation can occur simultaneous with mining and processing using excess materials or imported fill.

In 2007, after Vulcan had mined Area M to its maximum permitted depth of 120 feet bgs, the City approved Minor Modification No. 07-08 ("MM 07-08"), which authorized the relocation of the approved processing operations from Area N to Area M.

In 2009, the City approved Minor Modification No. 09-09, which clarified that DP 97-24 had vested and did not have a termination date.

2.1.2 Background – Area K

Area K is a 36-acre strip of land within the Specific Plan immediately east of Area L that is identified for use as "light industrial/buffer development." The Specific Plan anticipated that Area K would be developed with lots ranging from one to two acres in size that would be occupied primarily by light manufacturing, assembly, or other compatible uses. Buildings in Area K were intended to serve as a buffer for mineral extraction activities, however, a combination of "earthen berms and/or landscape screen vegetation [can] be used to accomplish the same objective." (Draft 1993 EIR, pg. 2-14.) The 1993 EIR anticipated that light industrial activities on Area K would produce a total of 2,160 total daily vehicle trips entering and exiting on Cajon Boulevard.

In 2022, the City approved construction of an approximately 10-foot tall earthen and vegetated berm along the eastern portion of Area K. The berm has been constructed and screens views into the Cajon Creek Quarry from Cajon Boulevard.

2.1.3 Background – Area Q Quarry

In 2020, the County approved a zone change, Conditional Use Permit, and Reclamation Plan (CUP/PROJ-2019-00073) authorizing the 196-acre Area Q Quarry. The Area Q Quarry is located on land directly adjacent to the southern portion of the Cajon Creek Quarry.

The County's approval of the Area Q Quarry authorized Vulcan to continue mining operations into Area Q. The Area Q entitlements permit mining to a depth of 120 feet bgs, with final reclaimed slopes left at a 2:1 (h:v) configuration. Aggregate would be mined at the same rate as it is currently being mined at the Cajon Creek Quarry and would be transferred via an extension of the existing conveyor system in Area L to Vulcan's permitted processing facilities.

Aside from being a new material source, the Area Q entitlements do not involve any substantial changes to Vulcan's existing Cajon Creek Quarry operation. The pace, nature, equipment used, and traffic generation/routes will not change.

2.2 REGIONAL SETTING

The Project site is split between the City and County of San Bernardino. Areas K, L, M, and N are located within the northwest portion of the City. Area Q is located within the County. The Project site is located in a non-sectioned portion of Township 1 North, Range 5 West, San Bernardino Baseline and Meridian. It is depicted on the United States Geological Survey (USGS) San Bernardino North, California (1980) 7.5-minute topographic quadrangle. The approximate site coordinates are at latitude 34.10° N and longitude 117.21° W. Figures 1 and 3 in Appendix A show the site setting of the Project.

A variety of similar mining and industrial land uses exist in the vicinity of the Project site. CEMEX's Lytle Creek Quarry is located approximately 2.0 miles to the west. Vulcan's Highland

Processing Plant is approximately 2.5 miles to the southwest, along Highland Avenue. Industrial facilities are located to the north and east across Cajon Boulevard. The residential community of Muscoy is located south of Area Q across Devil Creek Diversion Channel. The Southern Pacific Railroad (SPRR) runs through the Project site dividing Areas M and N from Areas L, K, and Q.

The existing topography immediately surrounding the Project site is generally flat. Foothills of the San Bernardino Mountains are located approximately 3.0 miles to the northeast, and foothills of the San Gabriel Mountains are located approximately 4.0 miles to the northwest of the Project site. The undeveloped Cajon Creek and Lytle Washes are located just west of the Project site.

The region is identified under the Köppen climate classification as a Mediterranean climate zone. The regional climate is characterized by warm, dry summers and mild winters. Most rainfall occurs in the winter months, usually beginning in November with the rain season lasting through April. Winters can average temperatures from 67° to 40° Fahrenheit (F) and are generally considered to be mild in nature, with the majority of the 16.1 inches of annual rainfall occurring over the winter season. Summers are warm and dry, with average temperatures ranging from 94° to 59° F (Western Regional Climate Center, 1927-2005). This climate has made the region relatively stable throughout the year with regard to fluctuating weather patterns.

The surrounding land uses are summarized in Table 2-3.

Table 2-3 Surrounding Land Uses

Direction	Land Use Designation	Description
West	Undeveloped Land	The Lytle Creek/Cajon Creek drainage located to the west.
East	Industrial Heavy (IH)	Industrial developments are located east of the site, across Cajon Boulevard.
South	Muscoy/Single Residential – 1-acre Minimum (MS/RS-1)	The Devil Creek Diversion Channel runs down the southern boundary of the site, and the residential community of Muscoy is located directly south of this diversion channel.
North	Undeveloped Land & Industrial Development	Undeveloped land/a large industrial warehouse occurs north of the Project site and light industrial development to the northeast.

SMARA includes a process whereby the State formally acknowledges geographical areas that contain mineral resources and the significance of these resources to the state and/or region. The State Department of Conservation (DOC) through the California Geological Survey (CGS) and the State Mining and Geology Board (SMGB) implements the mineral land classification/designation process for mineral resource conservation. Through this process, the portion of the Cajon Wash that includes the Cajon Creek and Area Q Quarries was recognized as Mineral Resource Zone 2 (MRZ-2) in the 1987 SMARA Designation Report No. 5 (DR-5) and designated as Sectors C-5 and C-6.

2.4 PROJECT SITE

The Project site comprised of multiple parcels, which are identified in Table 2-4. Table 2-4 also provides the General Plan Land Use and Zoning designations for each parcel. Figure 2 provides the parcel boundaries. Figures 1 and 2in Appendix A also contain the existing and proposed City and County land uses for the Project.

Table 2-4 List of Parcels, Ownership and Land Use Designations

Parcel Number	Property Owner	Land Use Designation
County Parcels		
0262-201-11-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-201-12-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-201-13-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-201-14-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI)_ Zoning: Community Industrial (IC)
0262-211-02-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-211-03-0000	Calmat Co. 31 Rancho Camino Drive, Suite 300 Pomona, California 91766	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-211-04-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-211-05-0000	Calmat Co. 31 Rancho Camino Drive, Suite 300 Pomona, California 91766	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-211-06-0000	Arundel Company, LLC 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial
0262-221-03-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)

Parcel Number	Property Owner	Land Use Designation
0262-221-04-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-05-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-09-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-10-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial Zoning: Community Industrial (IC)
0262-221-11-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-12-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-13-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-17-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-21-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-23-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-29-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-221-30-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI)_ Zoning: Community Industrial (IC)
0262-231-01-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI)_ Zoning: Community Industrial (IC)

Parcel Number	Property Owner	Land Use Designation
0262-241-13-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-241-14-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
0262-241-16-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial
0262-241-26-0000	Vulcan Lands, Inc. 1200 Urban Center Drive Birmingham, Alabama 35242	General Plan: General Industrial (GI) Zoning: Community Industrial (IC)
City Parcels		
0262-051-38-0000	Calmat Co. 31 Rancho Camino Drive, Suite 300 Pomona, California 91766	General Plan: Industrial Extractive Zoning (Specific Plan): Mineral Resource Extraction
0262-051-39-0000	Calmat Co. 31 Rancho Camino Drive, Suite 300 Pomona, California 91766	General Plan: Industrial Extractive Zoning (Specific Plan): Mineral Resource Extraction
0262-051-40-0000	Calmat Co. 31 Rancho Camino Drive, Suite 300 Pomona, California 91766	General Plan: Industrial Extractive Zoning (Specific Plan): Mineral Resource Extraction
0262-051-45-0000	Calmat Co. 31 Rancho Camino Drive, Suite 300 Pomona, California 91766	General Plan: Industrial Light Zoning (Specific Plan): Buffer Development – Light Industrial
0262-051-46-0000	Calmat Co. 31 Rancho Camino Drive, Suite 300 Pomona, California 91766	General Plan: Industrial Extractive Zoning (Specific Plan): Mineral Resource Extraction
0262-051-47-0000	Calmat Co. 31 Rancho Camino Drive, Suite 300 Pomona, California 91766	General Plan: Industrial Light Zoning (Specific Plan): Buffer Development – Light Industrial
0262-061-43-0000	Calmat Co. 31 Rancho Camino Drive, Suite 300 Pomona, California 91766	General Plan: Industrial Extractive Zoning (Specific Plan): Mineral Resource Extraction

Parcel Number	Property Owner	Land Use Designation
Total Acres:	**531**	

Notes: Total acreage inclusive of recorded easements.

2.6 MINING OPERATIONS

Project mining operations would continue to be typical of surface aggregate mining operations and would be conducted in the same manner as is currently occurring at Vulcan's existing Cajon Creek and Area Q Quarries. There would be no changes to the existing mining methods or equipment, and aggregate would continue to be extracted from the Project site using existing mobile equipment (excavators, loaders, dozers, etc.). Recovered materials would continue to be transferred via the existing onsite conveyor infrastructure. The mined material would continue to be processed and shipped from Vulcan's existing permitted locations, including the Highland facility and processing facilities permitted on Planning Areas M and N.

It is anticipated that resource recovery would commence and continue in Areas K and L until reaching the maximum proposed mining depth of 240 feet bgs. Operations would then move into Area Q until reaching the maximum proposed mining depth of 240 feet bgs. Resource recovery would then transition to the northern portion of Area N, to the maximum proposed mining depth of 120 feet bgs. Material mined from these areas would be processed and shipped from Vulcan's existing permitted locations, including Vulcan's Highland Avenue Plant and the Area M processing plants. The Area M processing plant would then be relocated to Area N, and Area M would be mined to the maximum proposed depth of 240 feet bgs. This anticipated mining plan is subject to variation depending on mineral quality and market demand.

Final reclaimed slopes would continue to be a maximum 2:1 (h:v) configuration. As with the existing operations, blasting would not be required. The number of employees and the hours of operation would remain the same as currently approved. Specifically, Project mining operations would continue to occur between the hours of 6:00 a.m. and 10:00 p.m., Monday through Saturday, consistent with the existing entitlements approved previously by the City and County of San Bernardino. Onsite operations would continue to be limited to a 12-hour period within the applicable hours of operation.

Extraction rates of aggregate would be consistent with current production, subject to market demand. Consistent with existing production and the assumptions in the prior EIRs, the Project would provide for between approximately 1.3 to 3.1 million tons of material annually, with an anticipated maximum of no more than 3.1 million tons annually, depending on market demand.

Total vehicles trips would remain at approximately 950 trips per day, with 800 trips associated with haul trucks and the other 150 trips associated with employee vehicles. These trips are consistent with both actual operations and the assumptions analyzed in the prior EIRs.

The Project proposes continuation of existing resource recovery on Area K. The previously approved light industrial development on Area K will be replaced with this use. An anticipated

2,160 vehicle trips per day were analyzed in the Specific Plan approvals. These trips will remain unused, and banked, as within the scope of prior environmental reviews.

The Project would continue to provide a high-quality source of local aggregate materials to serve the regional market, and would provide a continuing source of raw aggregate materials for processing at Vulcan's permitted facilities. It is expected that approximately 144.1 million bank tons, which includes the removal of the overburden and unsaleable aggregate, would be extracted over an estimated 70-year period, depending on market demand. Because the majority of the Project site is part of an existing and active surface mining operation, the majority of topsoil/subsoil has already been removed and is stored in stockpiles and perimeter berms for screening and future use during reclamation. Any topsoil and subsoil remaining within undisturbed areas would be removed as a separate layer prior to mining and stored within the existing stockpiles and berms, consistent with the current entitlements.

If feasible, reclamation activities, discussed below, may occur concurrently during ongoing mining operations. It is estimated that mining operations would cease by approximately the end of 2093, and reclamation of the full site would be completed by approximately 2095 with onsite monitoring until the year 2098.

2.8 RECLAMATION PLAN

The Project seeks adoption of an updated, consolidated Amended Reclamation Plan covering both the Cajon Creek Quarry and Area Q Quarry ("Amended Reclamation Plan"). The only change proposed by the Amended Reclamation Plan would be to update reclamation activities to conform with modern performance standards and account for updated mining depths and reclamation of new areas. As designed this Project would improve the site reclamation by eliminating slopes between some individual pits. Actual reclamation activities, the end use, final slope configuration, and the revegetation approach, however, would remain generally consistent with the existing reclamation plans.

Once mining at the Project site is complete, the Project site would be reclaimed back to open space. If feasible, portions of the site may be reclaimed and revegetated concurrent with mining in other areas of the Project site. Final reclaimed slopes would be left at a 2:1 (h:v) configuration. Topsoil and subsoil stored within Project site berms would be used for reclamation and revegetation ground cover. Areas K, L, M, and N may be filled up to a higher grade using imported clean fill, consistent with the current Cajon Creek Quarry entitlements. Revegetation would occur using a seed mix previously approved by both the City and County, and will be sourced from nearby areas.

3.0 ADDENDUM ANALYSIS

The following analysis uses the CEQA Appendix G Environmental checklist to evaluate whether the Project would result in new significant environmental effects or increase the severity of a previously identified environmental effect.

The following environmental topics are reviewed in this Addendum:

3.1 Aesthetics
3.2 Agriculture and Forestry Resources
3.3 Air Quality
3.4 Biological Resources
3.5 Cultural Resources
3.6 Energy
3.7 Geology and Soils
3.8 Greenhouse Gas Emissions
3.9 Hazards and Hazardous Materials
3.10 Hydrology and Water Quality
3.11 Land Use and Planning
3.12 Mineral Resources
3.13 Noise
3.14 Population and Housing
3.15 Public Services
3.16 Recreation
3.17 Transportation
3.18 Tribal Cultural Resources
3.19 Utilities and Service Systems
3.20 Wildfire

Updated technical reports/memorandums were prepared to address the environmental topics of Air Quality, Greenhouse Gas Emissions, Biological Resources, Geology/Geotechnical, Hydrology and Water Quality, as well as Noise and Vibration.

The first step in the Addendum analysis was to compare the 1993 Cajon Creek Quarry/Specific Plan EIR and the 2020 Area Q Quarry EIR with the Project. Once the changes between the previous EIRs and the Project were identified, the Addendum analysis evaluated the potential impacts associated with the changes and whether or not the changes would result in a new significant environmental effect or an increase in severity of a previously identified environmental effect. Table 3-1 identifies how the Project would be different from what was evaluated for the previous projects in the EIRs for the Cajon Creek and Area Q quarries. Potential impacts associated with the identified changes were then evaluated for each CEQA Appendix G resource area/topic. Sections 3-1 through 3-20 provide the analysis of the potential impacts, conclusions, and a summary table of the findings.

Table 3-1 compares the Cajon Creek and Area Q Quarry projects with the proposed Project.

Table 3-1 Comparison of the 1993 Cajon Creek Quarry EIR and 2020 Area Q EIR with the Project

Operational Information	Cajon Creek & Area Q Quarries	Project	Project Change
Mining & Processing Area	Total Site: 495 acres • Area L: 131 acres • Area M: 98 acres • Area N: 70 acres • Area Q: 196 acres	Total: 487 acres • Area K: 35 acres • Area L: 133 acres • Area M: 100 acres • Area N: 22 acres[1] • Area Q: 196 acres	-8 acre reduction in mining and processing areas.
Throughput	Typical Annual Extraction Rate: 1.3 to 3.1 million tons/year, based on market demand. Maximum Annual Extraction Rate: 3.1 million tons/year, based on market demand.	Typical Annual Extraction Rate: 1.3 to 3.1 million tons/year, based on market demand. Maximum Annual Extraction Rate: 3.1 million tons/year, based on market demand.	No change.
Mining Depth	120-feet bgs	240-feet bgs	120-feet bgs
Reclaimed Slope Configurations	Slopes: 2:1 (h:v)	Slopes: 2:1 (h:v)	No Change
Mining/Processing Operations	Excavation using mobile equipment (excavators, scrapers, dozers, loaders, etc.) Material processing at existing permitted facilities (i.e., Vulcan's Highland Plant or Area N/M)	Excavation using mobile equipment (excavators, scrapers, dozers, loaders, etc.) Material processing at existing permitted facilities (i.e., Vulcan's Highland Plant or Area N/M)	No Change
Traffic	950 vehicle trips per day • 800 haul tuck trips/day • 150 employee vehicle trips/day	950 vehicle trips per day • 800 haul tuck trips/day • 150 employee vehicle trips/day	No Change [2]
Mobile Equipment	• Dozers/Scrapers • Loaders • Grader • Mobile Water Truck	• Dozers/Scrapers • Loaders • Grader • Mobile Water Truck	No Change
Operational Hours	12-hour period between 6:00 a.m. and 10:00 p.m., Monday through Saturday.	12-hour period between 6:00 a.m. and 10:00 p.m., Monday through Saturday.	No Change
Onsite Employees	10 to 15 employees (at one time)	10 to 15 employees (at one time)	No Change

Operational Information	Cajon Creek & Area Q Quarries	Project	Project Change
Material Transport	Onsite: Existing conveyance infrastructure. Offsite: From existing and permitted facilities (Highland Plant and Area M/N).	Onsite: Existing conveyance infrastructure. Offsite: From existing and permitted facilities (Highland Plant and Areas M/N).	No Change
Water Source & Use	Source: Groundwater well in Area M, 15,000 tank at Area L. Consumption: 19.5 acre-feet (AF) per year.	Source: Groundwater well in Area M, 15,000 tank at Area L. Consumption: 19.5 acre-feet (AF) per year.	No Change
Electricity Source	Source: Existing Southern California Edison (SCE) infrastructure.	Source: Existing Southern California Edison (SCE) infrastructure.	No Change
Wastewater / Bathrooms	Onsite portable sanitation facilities.	Onsite portable sanitation facilities.	No Change
Reclaimed End Use	Open Space	Open Space	No Change

[1] Vulcan placed the southern portion of Area N, consisting of approximately 48 acres, into a permanent conservation easement in 1998.

[2] As with the permitting of Area Q, the Project proposes no change in traffic movements or volume.

3.1 AESTHETICS

3.1.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.1.5, was used to identify whether the proposed changes necessary for the consolidation of the Cajon Creek and Area Q Quarries (the Project) would result in new significant impact or an increase in the severity of a previously identified environmental effect on aesthetic resources when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the analysis of the proposed changes and findings.

3.1.2 1993 EIR Conclusions

The 1993 EIR included a discussion of the existing environmental setting, potential impacts and mitigation measures for aesthetics and visual resources. (Draft 1993 EIR, pgs. 4-90 – 4-101; Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 19-21.) The 1993 EIR concluded that the Specific Plan (Areas K, L, M and N) would potentially result in alteration of the visual character of the site, landform alterations, and light and glare.

The 1993 EIR concluded that, with the incorporation of mitigation measures designed to avoid or substantially lessen the potential visual impacts, impacts to visual resources as a result of development under the Specific Plan would be reduced to a less than significant level. In support of these findings, the 1993 EIR states that the site is not identified as a significant visual landmark or within a scenic vista and the project is not in conflict with the City's plans, as identified in the General Plan. With respect to landform alteration associated with mining uses, the 1993 EIR states that:

> The Landform alteration due to mining is a potentially significant impact but is mitigated through the implementation of the Specific Plan and the Conditional Use Permit/Reclamation Plan the latter of which requires backfilling (with inert material) the mining pits to a subgrade level, phased reclamation and revegetation, buffering around the mining areas with landscaped berming and ultimate industrial development.
>
> (Resolution Certifying Final 1993 EIR, Attachment 1, pg. 21.)

As respects to lighting, because the lights would be focused downward and inward onto work areas and machinery, the introduction of a new light source would not result in any significant impacts. (Resolution Certifying Final 1993 EIR, Attachment 1, pg. 21.)

The mitigation measures adopted as part of the 1993 EIR included the following:

- As phased mining activities progress, previously extracted areas shall be concurrently reclaimed, and revegetated with indigenous plant materials in conformance with the Reclamation Plan and Revegetation Plan.

- Aggregate processing equipment shall be low profile or visually screened whenever practical in order to minimize views of this equipment.

- Aggregate plant site structures, such as crushers, conveyor systems, and processing facilities, shall be painted with one or more non-intrusive colors that blend into the surrounding landscape.

- All lighting for mining and processing facilities shall be directed on-site and shall be downward oriented to provide direct lighting in the immediate area so that potential glare effects upon surrounding land uses are reduced.

- Landscape screening shall be used along portions of the western boundary of the project area to visually buffer views from sensitive viewers along Cajon Boulevard in accordance with Specific Plan Design Guidelines.

- If the planned light industrial developments within Planning Areas E and K, proposed to buffer extractive operations in Planning Areas F and L, are not developed prior to commencement of extractive operations, earthen berms and/or landscape screen vegetation shall be used to accomplish visual buffering until the developments are constructed.

  (Final 1993 EIR, pgs. ES-34 – ES-36.)

3.1.3 2020 EIR Conclusions

The 2020 EIR included a discussion of the existing environmental setting and potential impacts to aesthetics and visual resources. (Draft 2020 EIR, pgs. 3.1-1 – 3.1-43; Final 2020 EIR, pg. 1-7.) The 2020 EIR also identified project design features that were designed to limit impacts to aesthetic and visual resources, including:

> Prior to mining in Area Q, an approximate 10-foot high topsoil/subsoil storage berm would be constructed along the entire south perimeter of the Project site (referred to as the southern berm). The berm would be landscaped with low-lying vegetation (e.g., shrubs and grasses). Landscaping will be regularly maintained and trimmed so as not to exceed approximately 4-feet in height above the berm.
>
> No excavation of material or topsoil/subsoil would take place within twenty-five (25) to fifty (50) feet of a public right-of-way or within fifty (50) feet from other property lines.
>
> Except for the southern berm established for the purpose of visual screening and/or noise attenuation, no stockpiles would be placed closer than twenty-five (25) to fifty (50) feet from a property boundary.
>
> Operations would occur primarily during daylight hours. Operations during the time of year when daylight hours are shorter, or for any evening/nighttime operations, would require lighting to provide a safe operating environment. For

> evening/nighttime lighting, high pressure sodium and/or cut-off fixtures (or equivalent International Dark Sky Association (IDA)-approved fixtures) would be used instead of mercury-vapor fixtures for any required evening/nighttime lighting of the mining operations. The lighting would also be designed to confine illumination to the Project site, and/or to areas that do not include light-sensitive uses.
>
> (Draft 2020 EIR, pg. 3.1-21.)

The 2020 EIR concluded that, with the incorporation of project design features discussed above, the Area Q Quarry would not impede scenic views, damage scenic resources, substantially degrade the existing visual character of the site, or create new sources of light or glare that would affect views. As a result, no mitigation measures were identified for aesthetic or visual resources in the 2020 EIR.

3.1.4 Analysis of New or More Severe Project Impacts

The Project would not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Aesthetics/Visual Resources.

Currently, the Project site is screened by approximately 10-foot high earthen and vegetated perimeter berms along the southeast side of Area Q and on Area K along Cajon Boulevard. Operations under the existing entitlements have brought Areas M and L below original grade. See the photos below which shows the existing perimeter berms along eastern (i.e., Cajon Boulevard) and southern boundaries (along the Devil Creek Diversion Channel) of the Project site, which provide significant visual screening.



Source (2022): Photo of the existing berm which extends along the entire eastern perimeter of the Project site. Photo taken from Area K/L entrance looking northwest from Cajon Boulevard.



Source (2022): Photo of the existing berm which extends along the entire southern perimeter of the Project site/Area Q. Photo is looking northwest where Cajon Boulevard crosses the concrete channel.

The Project would increase mining depth, however, this would decrease the potential for impacts to the visual character of the Project area because mining activities would be below grade level and line of sight. The Project would also result in resource recovery in Area K which was previously approved for light industrial activities. Light Industrial activities could include large warehouses and other multi story building complexes that would generally be more visible compared to below grade mining activities in Area K as contemplated under the Project. Additionally, the existing perimeter berm adjacent to Cajon Boulevard would fully obscure public views of onsite mining activities within Area K.

Area N was approved for resource processing plants (i.e., aggregate plant, ready-mixed concrete plant, asphaltic concrete plant, re-crush plant, etc.) at surface grade. While the Project would allow for resource recovery in a portion of Area N, this activity would not create any new or more severe visual impacts. Additionally, processing within Area N would now occur at a depth of 120-feet bgs, and therefore the pit walls would obscure views of the onsite processing plant. As with the other mining areas, this would decrease the potential impacts to aesthetic resources as the mining depth increases. All other visual impacts associated with the operation were previously analyzed in the previous EIRs.

The 1993 EIR and 2020 EIR reviewed the Cajon Creek and Area Q Quarries as it related to visibility from the nearby community of Muscoy and Cajon Boulevard. As discussed in the 1993 EIR and the 2020 EIR, the vegetated earthen berms shield/screen the Project site from view from adjacent properties. Additionally, the Cajon Wash area where the Cajon Creek and Area Q Quarries are located is not considered a scenic resource.

Since certification of the 1993 EIR and 2020 EIR, development in the vicinity of the Project site has not created the potential for an increase in visual impacts. Following certification of the 1993 EIR, new industrial uses were developed north of the Project site along Cajon Boulevard that provide an additional visual barrier for the site. The distance to the nearest sensitive residential uses has not changed. The closest homes are located in the nearby community of Muscoy, and they continue to be the closest homes to the site today.

3.1.5 CEQA Appendix G Environmental Significance Criteria

Except as provided in Public Resources Code Section 21099, the CEQA Appendix G Environmental Checklist contains the following criteria which notes a potential aesthetic impact would result if the project would:

a) Have a substantial adverse effect on a scenic vista?

No. This is the continuation of an existing mining and construction materials operation. There were no scenic vistas in the vicinity of the previous projects that would have been impacted by the Cajon Creek or Area Q quarries, nor are there any new scenic vistas been identified that could be impacted by the consolidation of the two quarries.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No. As determined in the previous EIRs, there are no state scenic highways in the vicinity of the Project site, nor are there any scenic resources such as trees, rock outcroppings or historic buildings at or near the Project site.

c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

No. As determined by the previous EIRs, the Cajon Creek Quarry and the Area Q Quarry would not substantially degrade the existing visual character or quality of public views of the site. The Project site consists of two existing aggregate quarries with highly disturbed ground surfaces. The Project would not change the visual character of the site.

The Project would increase mining depth; however, this would decrease the potential for impacts to the visual character of the Project area because mining activities would occur further below grade level and out of line of sight from nearby public viewpoints. The Project would also result in resource recovery in Area K in place of the previously approved light industrial developments. Light industrial developments could include large warehouses and other multi story building complexes, whereas below grade mining in Area K would create less of a potential visual impact. Similarly, while material processing was previously approved in Area N, the 1993 EIR evaluated the visual effects of the plant operate at-grade, while the Project contemplates processing within Area N occurring at 120-feet bgs. Because Area N processing would occur below grade and therefore out of sight, this would decrease the potential impact on aesthetics compared to what was determined in the 1993 EIR. All other visual impacts associated with the operation were analyzed in the previous EIRs, and would remain unchanged as a result of the Project.

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

No. The previous EIRs evaluated the potential impact associated with light or glare from the mining operations. Project design features and mitigation measures were established and implemented to minimize the potential impact of light and glare to a less than significant impact. The Project would continue to enforce these measures and would therefore not result in any changes to the existing conditions.

For these reasons, the Project would not create any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Aesthetics Resources, when compared to those previously evaluated and disclosed within the 1993 EIR and the 2020 EIR.

3.1.6 Addendum Conclusions

The Aesthetics Sections in the 1993 EIR and 2020 EIR remain accurate and the conclusions are unchanged by this Addendum. The Project would not create any new significant environmental effects or substantially increase the severity of any significant impacts identified in the previous EIRs. All previously identified project design components and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Have a substantial adverse effect on a scenic vista?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (Public views are those that are experienced from publicly accessible vantage point)? If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	Less than Significant with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	Less Than Significant with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.2 AGRICULTURE AND FORESTRY RESOURCES

A detailed discussion of agriculture and forestry resources has been scoped out from this Addendum. The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on agriculture and forestry resources if it would:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51105(g))?

d) Result in the loss of forest land or conversion of forest land to non-forest use?

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

The Project site would not convert any prime farmland, unique farmland or farmland of Statewide Importance to non-agricultural use. According to mapping information available through the Department of Conservation (DOC) Farmland Mapping and Monitoring Program (FMMP), the Project site is designated as either "Grazing Land" or "Other Land," as shown in the "San Bernardino County Important Farmland 2018" Map (Department of Conservation, 2018). Grazing land is not considered prime farmland, unique farmland or farmland of Statewide Importance.

Portions of the Project site (Area Q) are zoned as Community Industrial (IC) use by the County of San Bernardino (County of San Bernardino, 2020) or Calmat/Cajon Creek – SP 90-10, specifically either Mineral Resource Extractive or Light Industrial (Area K), by the City of San Bernardino (City of San Bernardino, 2005). The entirety of the Project site consists of the existing aggregate surface mining and processing operations (the Cajon Creek and Area Q quarries) and is surrounded by industrial facilities, the Cajon Creek Wash, and the residential community of Muscoy. As such, no agricultural or forest land exists within or adjacent to the site, and no existing agricultural or forest land would be converted as a result of the Project. For these reasons, the Project would not create any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Agriculture and Forestry Resources when compared to those previously evaluated and disclosed within the 1993 EIR and the 2020 EIR.

3.3 AIR QUALITY

3.3.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.3.5, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect on air quality when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the Addendum analysis and findings.

3.3.2 1993 EIR Conclusions

The 1993 EIR included Environmental Setting/Potential Impacts/Mitigation Measures sections for Air Quality. (Draft 1993 EIR, pgs. 4-17 – 4-33; Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 10-13, 26-28.) The 1993 EIR relied on findings from an air quality impact analysis prepared by Giroux & Associates in July 1991 (Giroux & Associates, 1991). The evaluation of Air Quality impacts in the 1993 EIR did not involve an evaluation of Greenhouse Gas (GHG) Emissions. The potential sources of air quality impacts associated with the project were fugitive dust from scattered sources and processing equipment, increased dust emissions from all rock production and distribution, dust emissions during Santa Ana wind conditions, aggregate product hauling and industrial park vehicular emissions of reactive organic gases (ROG), carbon dioxide (CO_2), and nitrogen oxides (NO_X), and increased stationary source emissions from light and heavy industrial uses and asphaltic concrete plants.

The 1993 EIR determined that, with the exception of impacts from combustion emissions sources (aggregate product hauling and industrial park vehicles) and cumulative air quality impacts from combustion and dust, changes to the project and mitigation measures would avoid or substantially lessen air quality impacts. A statement of overriding considerations was approved for significant and unavoidable impacts associated with particulate matter (PM_{10}) generated by dust during Santa Ana wind conditions and combustion emissions sources.

The specific emissions sources associated with the Cajon Creek Quarry that were evaluated in the 1993 EIR include: aggregate extraction and processing, aggregate product manufacturing operations (concrete and asphaltic cement production), and vehicular emissions. It determined that, "although impacts can generally be maintained within acceptable levels through the use of control measures, *i.e.*, from good operational practices, proper housekeeping and use of supplemental dust suppression measures, there will be instances where aggregate resource development may incrementally degrade air quality (especially for particulates) beyond the project boundary" (e.g., Santa Ana wind conditions).

Stationary source emissions, including odors, from asphalt and concrete production would be regulated by SCAQMD, which would require processing facilities to minimize potential air quality impacts. Compliance with SCAQMD regulations with respect to asphalt and concrete manufacturing would reduce potential air quality impacts associated with stationary source emissions to a level of non-significance.

The mitigation measures adopted as part of the 1993 EIR include the following:

- Control of fugitive emissions shall result from good operational practices, proper housekeeping and use of supplemental dust suppression measures. Minimum implementation action of the mitigation measures will be to meet the requirement of AQMD Rule 401.

- These activities are controlled by SCAQMD permit conditions and by specified control measures in the District's Best Available Control Technology (BACT) guidelines. Material handling and in-plant travel will be controlled through a program of paving offsite access road and major intra-plant travel paths.

- Material transport to the fixed plant site in Planning Area N will utilize a conveyer.

- If some or all materials transfer between mining and processing Planning Area occurs via off-road hauling, the associated dust impact would be mitigated through implementation of dust control measures required by SCAQMD as a provision of permitting.

- SCAQMD requirements under Rule 401 shall be implemented. A berm system, in conjunction with a windbreak, will be included in the landscaping north of the Planning Area N processing plant to reduce wind through the plant. A line of landscaping near the southern site boundary will also trap dust picked up by the winds.

- The impact potential related to dust generation during Santa Ana wind conditions shall be reduced as a result of industrial developments within the Specific Plan Planning Areas. This mitigation will result from paving over open areas, the presence of buildings, berming, and landscape. The features will reduce the amount of erodible surface and increase surface roughness, thus creating breaks in the wind field.

- Dust emissions from the batch plant and asphaltic concrete production will be controlled through standard design features required by SCAQMD rules. No mitigation is required.

- Aggregate facilities access/egress shall be designed to minimize use of local arterial roadways or areas of existing or potential future air quality sensitivity.

- CalMat[4] shall provide a transportation demand management program (TDM) for all site tenants.

- Compliance with SCAQMD regulations for emissions off sets (SCAQMD Regulation XIII) upwind of Cajon Creek, and the use of BACT on the plant.

- Provisions for rail access for distribution of aggregate, have been incorporated into the project design to reduce truck trips and their length of travel. The project also includes a transportation demand management (TDM) program.

[4] Vulcan's predecessor.

- The standard design features required by SCAQMD together with the mitigation measures identified above will reduce dust emissions.

  (Final 1993 EIR, pgs. ES-12 – ES-16.)

The 1993 EIR found that potential air quality impacts can be mitigated to a level of insignificance following application of the mitigation measures listed above, except for significant and unavoidable impacts from dust and combustion emissions discussed above.

3.3.3 2020 EIR Conclusions

The 2020 EIR included Environmental Setting/Potential Impacts/Mitigation Measures sections for Air Quality and GHG Emissions. (Draft 2020 EIR, pgs. 3.2-1 – 3.2-44, 3.6-1 – 3.6-26; Final 2020 EIR, pg. 1-7.) The 2020 EIR also relied on air quality, health risk and climate change analysis findings within the Air Quality, Health Risk, and Climate Change Impact Assessment (AQCCIA) prepared by Sespe Consulting, Inc. in 2020 (Sespe Consulting, 2020).

The potential sources of air quality impacts associated with the project were offroad engine emissions, wind erosion, bulldozing/quarrying, and aggregate handling. The assessment of potential air quality impacts in the 2020 EIR incorporated the following assumptions and project design features:

- The excavation and associated equipment would operate in compliance with applicable air quality regulations.

- Diesel engines would comply with applicable state regulations (i.e., ATCM). This includes labeling of off-road equipment with registration numbers assigned by CARB, establishment of an idling policy, and limiting idle time to less than five minutes (13 CCR §2449).

- Fugitive dust emissions would be controlled through implementation of the controls and compliance with performance measures in Rules 403 and 1157.

- Conveyors used to transport aggregate materials would be powered by grid electricity and replace existing conveyors within the current mining site (Area L).

- The Project is in San Bernardino County, which is among the counties that are unlikely to contain serpentine and ultramafic rock (OPR, 2000). No serpentine or ultramafic rock has been found on the Project site or in the vicinity of the Project. The Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR § 93105) allows the APCO from the local air district to exempt materials produced by facilities that mine alluvial deposits as would be the case for the Project. Therefore, asbestos was excluded from HRA performed for the Project.

- The Project would not store hazardous substances or acutely hazardous substances in quantities that would be subject to chemical accident prevention provisions of the CAA or the implementing regulation (40 CFR Part 68).

- The Project will not result in any off-site truck trips.

- Excavation/production rate of aggregates and equipment used to excavate would remain the same or decrease from existing conditions, subject to market demand.

- Emissions characteristics of off-road vehicle engines reflect the fleet currently operating on-site. Future year fleets considered in the cancer risk assessment incorporate engine turnover as required by the In-Use Off-road Engine ATCM.

- The assessment conservatively assumes that the Project will excavate aggregates for 15 years, but it is possible that the Project will operate for up to 30 years. It is conservative to assume mining will take place in this timeframe, as a 15-year span results in higher levels of exposure concentrated on modeled receptors during periods of increased cancer risk due to age sensitivity factors (ASF).

  (Draft 2020 EIR, pgs. 3.2-29 – 3.2-30.)

Using existing baseline figures based on actual achieved production data, the AQCCIA prepared by Sespe evaluated the Air Quality impacts associated with non-road engine emissions, wind erosion, bulldozing/quarrying, and aggregate handling based on the project design features described above. The AQCCIA also included a Health Risk Assessment (HRA) that was performed using best practices, including methods from the HRA Guidelines (OEHHA, 2015), and SCAQMD Rule 1401 guidance materials.

Based on the AQCCIA, the 2020 EIR found that emissions from continuation of operations at the Area Q Quarry would not result in any significant air quality impacts and that no mitigation was required.

The 2020 EIR evaluated whether offroad emissions sources and conveyor belt energy use associated with the Project would result in significant impacts. Total GHG Emissions from the project were estimated as part of the 2020 EIR which determined that the incremental GHG emissions for the Area Q Quarry were approximately 45 metric tons of carbon dioxide equivalent per year (CO2e MT/yr), well below the applicable SCAQMD screening thresholds for GHG emissions (i.e., 10,000 CO2e MT/year). Because the GHG emissions associated with the project were below applicable screening thresholds, the 2020 EIR determined that the Area Q Quarry would not result in significant impacts associated with GHG Emissions.

3.3.4 Analysis of New or More Severe Project Impacts

The Project would not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Air Quality.

The Project would continue existing operations in both currently permitted and new areas at the same pace and intensity as analyzed in the prior EIRs. No changes are proposed to mining methods or equipment, processing operations, annual production, or phasing. Additionally, there would be no change to the number of onsite employees or haul trucks entering or leaving the site.

The Project would use the existing equipment or equipment types that have been in operation at the Cajon Creek and Area Q Quarries, including bulldozers and front-end loaders. Recovered materials would be transported by loaders and an existing extendable electrified conveyor system. Other existing mobile equipment that would continue to be used includes a motor-grader, a water truck, and service truck. Notably, however, project equipment may utilize cleaner engines than were analyzed in the 1993 EIR or 2020 EIR to comply with California Air Resources Board (CARB) regulations that affect off-road diesel engines.

Sespe Consulting prepared an air quality, health risk and climate change technical memorandum, included in Appendix B, that evaluated the Project's potential impacts to air quality related to the changes from the projects analyzed in the previous EIRs. The evaluation addressed the effect of mining in Areas N and K, as well as increasing the depth of mining in the mining areas, and found that these changes would not result in any new significant air quality impacts or increase the severity of a previously identified environmental impact. Conversely, because of the following reasons, the emissions associated with the Project would be reduced compared to what was determined in the 1993 and 2020 EIRs:

- The excavation rate and number and type of mobile equipment would not change;
- The emission sources associated with the changes would be further away from the sensitive receptors, primarily compared to what was analyzed in the 2020 EIR (i.e., new mining in Area K and N would occur farther from nearby residences as compared to Area Q);
- The mining activities would be conducted further below ground level; and
- Regulatory requirements will require that Vulcan purchase new and/or retrofit existing in-use diesel engines over the life of the Project.

Additionally, since certification of the 1993 EIR and 2020 EIR, development in the vicinity of the Project site has not created the potential for increased health risk impacts. The distance to the nearest sensitive residential land uses has not changed, as the closest homes in 1993 and 2020 (the homes located in the nearby community of Muscoy) continue to be the closest homes to the site today. No new residential neighborhoods have been developed in the immediate Project area. Further the 1993 EIR assumed much of the onsite processing would occur at-grade, where there is a greater exposure to prevailing winds (i.e., Santa Ana winds) that would potentially increase fugitive dust emissions. By placing the processing operations within the excavation pits at Areas M and N under the Project, the sides of the pit wall would act as natural wind barriers that would decrease the potential for fugitive dust to impact nearby Muscoy.

All existing conditions of approval, project design features and mitigation measures that reduce potential air quality impacts, including those outlined above from the 1993 and 2020 EIRs would continue to be implanted as applicable. Therefore, the Project would not result in a new significant environmental effect or increase in the severity of a previously identified environmental effect

when compared to those addressed in the 1993 EIR and 2020 EIR. See Appendix B for additional detail.

3.3.5 CEQA Appendix G Environmental Significance Criteria

The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on air quality resources:

a) Conflict with or obstruct implementation of any applicable air quality plan?

Potential conflicts with applicable air quality plans were considered and ruled out. The Project may be affected by air quality plans indirectly because of actions taken, or rules implemented by, the SCAQMD. Literature on economics of aggregates production describes the demand for aggregates to be inelastic and incapable of causing population to grow. (AQCCIA, Appendix B.) In fact, aggregates consumption is proportional to population growth which is commonly used to predict future demand and accounted for in air quality plans. Thus, SCAQMD Air Quality Plan goals would be unaffected by the Project and this impact is less than significant.

Further, in terms of vehicle trips, the Project is within the envelope of prior analyzed assumptions.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard?

As noted, the Project would not result in any increase in criteria pollutants given that the Project is a continuation of existing operations over a slightly larger area. Project operations would continue at the same pace and intensity as analyzed in the prior EIRs and as is currently ongoing. No changes are proposed to mining methods, processing operations, annual production, or phasing. Because Vulcan would be required to purchase new and/or retrofit existing in-use diesel engines over the life of the Project, cumulative criteria pollutant emissions in future years would be reduced under the Project compared to what was determined in the 1993 and 2020 EIRs.

c) Expose sensitive receptors to substantial pollutant concentrations?

The Project calls for resource extraction in Area K and the northern portion of Area N. These two areas were not previously evaluated in the 1993 or 2020 EIRs: However, an AQCCIA which includes a Health Risk Assessment (HRA) was prepared by Sespe Consulting (2020) for the Area Q Quarry 2020 EIR. Because Area Q is closer to any sensitive receptors than Areas K, L, M or N, combined with the fact that the 2020 AQCCIA/HRA used what are still considered the most current regulations and guidelines, it is professionally reasonable to assume that the findings from the 2020 AQCCIA/HRA are representative of the potential impacts associated with the Project. In addition, the rate of production would not change and the number of site vehicles on public roads would either not change or be reduced since the previous EIRs. Sespe Consulting prepared a technical memorandum that further supports these findings. A copy of the air quality memorandum is provided in Appendix B.

Accordingly, the Project would not expose any sensitive receptors to substantial pollutant concentrations, nor would it change or increase potential health risk impacts compared as compared to the 1993 and 2020 projects.

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The Project would not result in an increase in other emissions, such as odors. As discussed above in criteria c, air quality and odors were evaluated in the 2020 EIR for Area Q which is closer to sensitive receptors than any of the other mining area. In addition, the processing activities would be located further below the ground level than those that were evaluated in the previous EIRs. Therefore, it is reasonable to assume that there would be no change or increase in the impacts associated with emissions such as odors.

3.3.6 Addendum Conclusions

The Project would not have any new significant environmental effect or increase the severity of a previously identified environmental effects related to Air Quality, when compared to the analysis in the 1993 EIR and 2020 EIR. All previously identified project design components and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Conflict with or obstruct implementation of the applicable air quality plan?	Less Than Significant with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	Significant and Unavoidable with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
c) Expose sensitive receptors to substantial pollutant concentrations?	Less Than Significant with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	Less Than Significant with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.4 BIOLOGICAL RESOURCES

3.4.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.4.5, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect on biological resources when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the addendum analysis and findings.

3.4.2 1993 EIR Conclusions

The 1993 EIR performed an evaluation of potential impacts to biological resources associated with development of the Specific Plan. The 1993 EIR relied on findings from biological evaluations conducted by Tierra Madre Consultants, Inc. in 1990. The 1993 EIR concluded that, aside from significant and unavoidable impacts to the slender-horned spineflower, mitigation measures and design features incorporated into the project will reduce potential impacts to biological resources to a less than significant level. (Draft 1993 EIR, pgs. 4-1 – 4-16; Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 7-9, 25-26.)

The 1993 EIR states that the project site contains habitat and associated wildlife and that the loss of habitat as a result of aggregate mining and related activities includes "640 acres outside of the flood plain (which is currently either degraded or disturbed) and 240 acres of Riversidian alluvial fan sage scrub habitat within the floodplain (which is in its natural state)." (Resolution Certifying Final 1993 EIR, Attachment 1, pg. 7.)

A field survey did not find that any presence of slender-horned spineflower, California gnatcatcher, or Los Angeles pocket mouse, and the 1993 EIR determined that there is a low potential for the California gnatcatcher or the Los Angeles pocket mouse to inhabit the site. Although no slender-horned spineflower was found on-site, the 1993 EIR assumed that there is a potential that this species would inhabit the project site and that "impacts on those species are unmitigatable but outweighed by project benefits." (Resolution Certifying Final 1993 EIR, Attachment 1, pg. 7.)

The 1993 EIR analyzed the unavoidable and adverse impacts to species as the result of the loss of Riversidian alluvial fan sage scrub habitat, finding that portions of Planning Areas O and P will be dedicated to open space, thus conserving over ninety-six percent (96%) of the Riversidian alluvial fan sage scrub habitat. As habitat is removed, associated wildlife will be impacted or displaced to adjacent habitat areas.

The 1993 EIR determined that changes to the project have reduced impacts to the slender-horned spineflower habitat to a level of non-significance, however, significant unavoidable adverse impacts would result if a slender-horned spineflower is found on-site. Follow up surveys of the project site are required, and California Department of Fish and Wildlife and United State Fish and Wildlife Service take authorization is required to disturb those species.

A statement of overriding considerations was adopted for the project. As stated in the Final EIR:

> The Council finds that the measures identified to minimize potential loss of habitat for this plant species will lessen the adverse impacts, however, it is not possible to provide for buildout of the proposed industrial development and utilization of mineral resources without the potential temporary disruption of the habitat should it occur onsite. The Council finds that no additional measures are known that can further reduce potential significant impacts to the slender-horned spineflower if it occurs onsite, without significantly and substantially interfering with General Plan objectives for future development."

(Resolution Certifying Final 1993 EIR, Attachment 1, pg. 26.)
The mitigation measures adopted as part of the 1993 EIR certification included the following:

- Near-term and intermediate term implementation of the Specific Plan provides for conservation of 488 acres in Planning Area O. The long-term management of this natural open space for biological resources, together with reclamation of the 257 acres within the active floodplain, following mining in Planning Area P, shall provide for conservation of sensitive habitat within approximately 745 acres of open space.

- Planning Areas which are not within the floodplain, including mined areas within Planning Areas L, M and F, and the processing plant areas within Planning Areas D, I and N, shall be planted with seeds to provide erosion control using the natural components of the Riversidian alluvial sage scrub.

- The following shall be implemented in accordance with the Reclamation Plan as provided for in the Revegetation Plan.

    - Container grown revegetation plant materials shall be propagated from either seeds or cuttings taken from the site. Collection and propagation of seeds and cuttings shall occur approximately one year prior to on-site planting.

    - Seeds, used for hydroseeding shall consist of only native species, obtained from on-site collection and collection from adjacent properties.

    - Maintenance of the revegetation areas shall be limited to weed eradication of invasive exotic species and replacement of container stock if necessary.

    - Monitoring of the revegetation areas shall be done annually, over a five year period in accordance with SMARA Section 2773(a). Minimum standards should be developed by CalMat in conjunction with the lead agency and Divisions of Mines and Geology (DMG).

    - Records shall be kept of the initial plantings with details to include; date of planting, planting locations of container materials and seeds. Subsequent monitoring shall

determine the total vegetative cover and species health/survival rates. If necessary, recommendations for replanting and weed removal shall be made.

- If the slender-horned spineflower is located during any of the surveys, the California Department of Fish and Game (CDFG) and the U.S. Fish and Wildlife Service (USFWS) shall be notified of the species presence on the site, and, if recommendations warrant it, a diligent effort will be made to salvage a plant population. A diligent effort to salvage a plant population will provide for the following:

    - If during a survey native species of the slender-horned spineflower are identified on the project site, its position will be marked (e.g., flagged or staked);

    - All identified locations where slender-horned spineflower plants were marked shall be revisited after the blooming season (i.e. July) for seed collection; and

    - Seeds of native species which have been collected from the site will provide for research and the establishment of a population under the guidance of the USFWS and the CDFG.

(Final 1993 EIR, pgs. ES-6 – ES-11.)

3.4.3 2020 EIR Conclusions

The 2020 EIR evaluated potential impacts to biological resources associated with development of the Area Q Quarry. The 2020 EIR relied on findings from a Habitat and Jurisdictional Assessment prepared by ELMT Consulting, Inc. in 2020. The 2020 EIR concluded that mitigation measures and design features incorporated into the project will reduce potential impacts to biological resources to a less than significant level. (Draft 2020 EIR, pgs. 3.3-1 – 3.3-49; Final 2020 EIR, pg. 1-7.)

The 2020 EIR states that the Project site is primarily flat and comprised of mostly undeveloped, degraded, and disturbed land. The raised Southern Pacific Railroad (SPRR) tracks and the Muscoy Groin are located to the west of the Project site. The Muscoy Groin #3 was constructed to direct surface flow/flood waters in the Cajon Creek drainage away from the SPRR tracks and the Project site. The Project site consists of both developed and undeveloped land that has been subject to a variety of human-related disturbances from existing rural residential developments, weed abatement activities, and illicit trash dumping. These land uses have resulted in most of the Project site being converted to non-native grasses, and highly degraded and disturbed plant communities that have been cut off from the influences of the Cajon Creek Wash by the railroad SPRR and Muscoy Groin #3. Lastly, no aquatic resources or jurisdictional wetlands are present on the Project site, and the existing development surrounding the site already limits wildlife movement opportunities.

The Project site was found to provide suitable foraging, nesting, and cover habitat for a variety of resident and migrant bird species. The Project site also has the potential to support birds that nest on the open ground and in the nonnative grasslands, such as killdeer (*Charadrius vociferus*) and

western meadowlarks (*Sturnella neglecta*). Additional nesting habitat is present within the ornamental vegetation located throughout the Project site, as well as in trees surrounding the site to the north. Lastly, the Project site is within Critical Habitat for San Bernardino kangaroo rat (SBKR), however, three protocol-level SBKR-focused trapping studies were conducted in 2017 and no SBKR were captured. As a result, the site is considered unoccupied by SBKR.

The 2020 EIR evaluated the project's potential impacts to biological resource categories as outlined in the CEQA Appendix G Guidelines. The 2020 EIR determined that all impacts to each of these resource categories from the Project were less than significant, with the exception of potential impacts to special-status wildlife species, which were determined to be less than significant with mitigation. The mitigation measures adopted as part of the 2020 EIR certification included the following:

- **Mitigation Measure BIO-1:** If determined necessary, consult with the California Department of Fish and Wildlife (CDFW) prior to the removal of any raptor nest on the Project site, if found.

- **Mitigation Measure BIO-2:** If ground disturbance and vegetation removal cannot occur outside of the nesting season, a preconstruction clearance survey for nesting birds should be conducted within thirty (30) days of the start of any vegetation removal or ground disturbing activities to ensure that no nesting birds will be disturbed during construction.

  The biologist conducting the clearance survey should document a negative survey with a brief letter report indicating that no impacts to active avian nests will occur. If an active avian nest is discovered during the preconstruction clearance survey, construction activities should stay outside of a 300-foot buffer around the active nest. For raptor species, this buffer is expanded to 500-feet. It is recommended that a biological monitor be present to delineate the boundaries of the buffer area and to monitor the active nest to ensure that nesting behavior is not adversely affected by the construction activity. Once the young have fledged and left the nest, or the nest otherwise becomes inactive under natural conditions, normal construction activities can occur.

  (Draft 2020 EIR, pgs. 3.3-42 – 3.3-43.)

3.4.4 Determination of No New or More Severe Project Impacts

The Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Biological Resources.

The majority of the Project site has already been disturbed by historical mining and processing operations: however, the Project would result in mining activities in Areas K and N, and in the areas between L, K, and Q, and Areas M and N, and mining within these areas was not analyzed in the prior EIRs. All other activities would continue in the same areas that were previously analyzed, the majority of which have already been disturbed. As discussed above, the Project involves no proposed changes to mining methods, processing operations, annual production, or phasing.

One regulatory change that has occurred since the City certified the 1993 EIR is that a portion of Area N was designated as Critical Habitat for the SBKR.

ELMT Consulting prepared a Habitat and Jurisdictional Assessment ("Habitat Assessment") (see Appendix C) to analyze the Project's potential biological impacts on new extraction areas (i.e., Areas K and N, as well as the small areas between the consolidated mining pits), with a particular focus on SBKR. As discussed in the Habitat Assessment, the new extraction areas consist of both developed and undeveloped land that has been subject to a variety of human-related disturbances from existing mining operations and surrounding development. Four plant communities were observed within the new mining areas: highly disturbed and degraded Riversidean alluvial fan sage scrub (RAFSS), buckwheat scrub, non-native grassland, and ornamental. Due to the isolation of the site and the removal of all hydrologic influences of the Cajon Wash, the Project site no longer supports viable RAFSS habitat with long-term conservation value. However, as noted above, the isolated and senescing RAFSS habitats identified on the project site has either succeeded to upland chaparral habitat or are no longer functioning as viable RAFSS habitat with long-term conservation value and no mitigation is required. Area N has no plant communities or biological resources within the assessed area, as soils within Area N have been heavily disturbed from ongoing and historical mining activities. The interstitial areas between Areas M and N, and Areas L and Q support irrigated planted/landscaped ornamental vegetation with an understory of a mix of non-native plant species that have established.

Special-status plant and wildlife species are confirmed absent from the Project site based on habitat surveys, habitat requirements, availability and quality of habitat needed by each species, and known distributions. Accordingly, implementation of the Project will have "no effect" on federally or State listed species known to occur in the general vicinity of the Project site. Further, no jurisdictional drainage and/or wetland features were observed within the Project site during the field survey. Based on a review of the Project, as well as the findings presented in ELMT's 2023 Habitat Assessment, no new or greater impacts to biological resources would result when compared to the biological impacts address in the 1993 EIR and 2020 EIR.

3.4.5 CEQA Appendix G Environmental Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant biological impact if the Project would:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

The Project's potential impacts to special-status plant and wildlife species was evaluated by ELMT in 2023. Note, the following summary applies to those onsite areas not previously evaluated within the 1993 and 2020 EIRs.

The Project site consists of both developed (mining areas) and undeveloped land that has been subject to a variety of human-related disturbances from existing mining activities and surrounding development. Four (4) plant communities were observed within the boundaries of Area K site

during the habitat assessment: 1) highly disturbed Riversidean alluvial fan sage scrub (RAFSS), 2) buckwheat scrub, 3) non-native grassland, and 4) ornamental. However, as noted above, the isolated and senescing RAFSS habitats identified on the Project site has either succeeded to upland chaparral habitat or is no longer functioning as viable RAFSS habitat with long-term conservation value. Due to the isolation of the site and the removal of all hydrologic influences of the Cajon Wash, Area K no longer supports viable RAFSS habitat, and no mitigation is required. Area N has no plant communities or biological resources within the assessed area, as soils within Area N have been heavily disturbed from ongoing and historical mining activities.

Based on the proposed project footprint and existing site conditions discussed in this report, no special status plant or wildlife species inhabit the Project site, and none of the special-status plant or wildlife species known to occur in the general vicinity of the Project site will be directly or indirectly impacted from implementation of the proposed Project. With completion of the recommendations provided below, no impacts to year-round, seasonal, or special-status avian residents or special-status species will occur from implementation of the proposed Project. Therefore, it was determined that implementation of the project will have "no effect" on federally or State listed species known to occur in the general vicinity of the Project site. Additionally, the development of the Project will not impact federally designated Critical Habitats, since there is no federal nexus and no federally listed species were documented onsite, or regional wildlife movement corridors/linkages.

Based upon ELMT's evaluation, the Project would not result in any new or greater significant impacts compared to those determined in the 1993 or 2020 EIRs.

b) Have a substantial adverse effect on Riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Per ELMT's report, Area K is not located within federally designated Critical Habitat. While the majority of Area N is located within designated Critical Habitat for San Bernardino kangaroo rat (refer to Appendix C), it is important to note, however, that no San Bernardino kangaroo rat were observed or trapped during extensive trapping surveys conducted by ELMT. Since there is no federal nexus, and no San Bernardino kangaroo rat were captured on the project site, Vulcan will not be required to initiate a Section 7 Consultation for the loss of Critical Habitat. Therefore, no impacts to federally designated Critical Habitat will occur from implementation of the proposed Project, and the Project would not result in any new or greater significant impacts compared to those determined in the 1993 or 2020 EIRs.

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

ELMT found that the Project site does not support any discernible drainage courses, inundated areas, wetland features, or hydric soils that would be considered jurisdictional by the Corps, Regional Board, or CDFW. A query of the NWI database found no potential blueline streams, riverine, or other aquatic resources within the project site. Therefore, project activities will not

result in impacts to Corps, Regional Board, or CDFW jurisdictional areas and regulatory approvals will not be required, and the Project would not result in any new or greater significant impacts compared to those determined in the 1993 or 2020 EIRs.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

According to the San Bernardino County General Plan, the Project site has not been identified as occurring within a Wildlife Corridor or Linkage. As designated by the San Bernardino County General Plan Open Space Element, major open space areas documented in the vicinity of the Project site include the Cajon Wash, located immediately west of the Project site. Further, in accordance with the City of San Bernardino's General Plan, the Project site is not located within any mapped riparian corridors. However, portions of the Project site are located within a City of San Bernardino General Plan mapped Biological Resources Area, which are areas that have to potential to support sensitive biological resources, but are not considered wildlife corridors or linkages.

As discussed in ELMT's report, the Cajon Wash is located immediately adjacent to the project site and is generally separated from the Project site by the edge of the 100-year floodplain and the railroad, and a bluff area with an elevation of as much as 20 feet. The Project site is not expected to provide upland movement opportunities from the Cajon Wash/Lytle Creek across the Project site. However, the active mining operations to the north, and high levels of human disturbances on the Project site restrict wildlife movement opportunities. For these reasons, Project implementation is not expected to have a significant impact to wildlife movement, and the Project would not result in any new or greater significant impacts compared to those determined in the 1993 or 2020 EIRs.

e) Conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance?

As discussed above and within ELMT's report, the only trees found on the Project site are ornamental trees found within the middle of the southern half of the Project site in association with residential developments. No protected or special-status species trees exist on the Project site. Additionally, none of the regulated trees, plants, or protected riparian areas outlined in the City or County general plans or ordinances pertain to the Project. For these reasons, the Project would not result in any new or greater significant impacts compared to those determined in the 1993 or 2020 EIRs.

f) Conflict with the provisions of Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

As described above and within ELMT's report, Area K is not located within federally designated Critical Habitat. While the majority of Area N is located within designated Critical Habitat for San Bernardino kangaroo rat (refer to Appendix C), no San Bernardino kangaroo rat were observed or trapped during extensive trapping surveys conducted by ELMT. Since there is no federal nexus, and no San Bernardino kangaroo rat were captured on the project site, Therefore, no impacts to

protected habitats or natural communities will occur from implementation of the proposed Project, and the Project would not result in any new or greater significant impacts compared to those determined in the 1993 or 2020 EIRs.

3.4.6 Addendum Conclusions

As discussed above, the Biological Resources evaluations in the 1993 EIR and 2020 EIR and the conclusions adopted with certification of the 1993 EIR and 2020 EIR remain accurate. However, since the 1993 EIR, portions of the Cajon Creek Quarry have been designated as Critical Habitat for the SBKR. Despite that change, the Project will not result in new significant environmental effects or an increase in the severity of previously identified effects, related to biological resources. All previously identified conditions and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	Significant and Unavoidable with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	Less than Significant Impact with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	No Impact	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	No Impact	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.5 CULTURAL RESOURCES

3.5.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.5.5, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect on cultural resources when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the addendum analysis and findings.

3.5.2 1993 EIR Conclusions

The 1993 EIR included an evaluation of Cultural and Historical Resources for the entire Specific Plan Area and determined that there were no impacts to Cultural and Historic Resources that require mitigation. (Draft 1993 EIR, pgs. 4-103 – 4-112.) A Cultural Resources Survey was conducted by ASM Affiliates, Inc. to identify cultural and historic resources on the site and assess potential impacts. The survey did not locate any prehistoric artifacts or historic sites and concludes that any cultural resources on the site would likely have been disturbed by past flooding and modern land uses. As a result, the 1993 EIR concluded that development of the Specific Plan would not result in any adverse impacts to cultural and historic resources.

3.5.3 2020 EIR Conclusions

The 2020 EIR included an evaluation of Cultural Resources for the entire Area Q Quarry and determined that the project would result in potential impacts to Cultural Resources that were less than significant after adoption of mitigation. (Draft 2020 EIR, pgs. 3.4-1 – 3.4-33; Final 2020 EIR, pg. 1-7.) A Cultural Resources Assessment was conducted by BCR Consulting LLC in May 2020 to identify cultural and historic resources on the site and assess potential impacts. The Cultural Resource Assessment identified four archaeological resources and eight historic buildings on the site or within one mile of the site but did not identify any cultural artifacts on the site.

The 2020 EIR determined that none of the historic buildings or historic-era archaeological sites in or near the project area met the eligibility criteria to be added to the National Register, California Register, or Local designation. Because there is always the possibility that excavation will result in the discovery of buried prehistoric or historic cultural deposits or human remains, the 2020 EIR adopted the following mitigation measures:

- **Mitigation Measure CUL-1:** Prior to the initiation of ground-disturbing activities, field personnel should be alerted to the possibility of buried prehistoric or historic cultural deposits. In the event that field personnel encounter buried cultural materials, work in the immediate vicinity of the find should cease and a cultural resources professional that meets the U.S. Secretary of the Interior Professional Qualification Standards for Archaeology (a qualified archaeologist) should be retained to assess the significance of the find. The qualified archaeologist would have the authority to stop or divert construction excavation as necessary. If the qualified archaeologist finds that any cultural resources present meet eligibility requirements for listing in the California Register of Historical Resources or the

National Register of Historic Places, plans for the treatment, evaluation, and mitigation of impacts to the find would be developed. Prehistoric or historic cultural materials that may be encountered during ground-disturbing activities include:

- historic artifacts such as glass bottles and fragments, cans, nails, ceramic and pottery fragments, and other metal objects;
- historic structural or building foundations, walkways, cisterns, pipes, privies, and other structural elements;
- prehistoric flaked-stone artifacts and debitage (waste material), consisting of obsidian, basalt, and or cryptocrystalline silicates;
- groundstone artifacts, including mortars, pestles, and grinding slabs;
- dark, greasy soil that may be associated with charcoal, ash, bone, shell, flaked stone, groundstone, and fire affected rocks.

- **Mitigation Measure CUL-2:** If human remains are encountered during Project operations, per State Health and Safety Code Section 7050.5, no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC.

  (Draft 2020 EIR, pgs. 3.4-30 – 3.4-32.)

With adoption of the above mitigation measures designed to address the potential for unanticipated discovery of cultural resources, the 2020 EIR concluded that development of the Area Q Quarry would not result in any adverse impacts to cultural resources.

3.5.4 2021 Cultural Resources Report

BCR Consulting LLC (BCR) prepared an updated Cultural Resources Assessment (see Appendix D) to analyze the Project's potential impacts to cultural resources in new extraction areas, specifically within Area K. As discussed in the Cultural Resources Assessment, the new extraction area in Area K consists of a land cover type that would be classified as disturbed. BCR completed a cultural resources records search, reconnaissance-level pedestrian cultural resources survey, Sacred Lands File search with the Native American Heritage Commission, and paleontological resources overview. The records search revealed that 25 cultural resource studies have taken place within one half-mile of the site, one of which assessed a portion of Area K. Seven cultural resources have been identified within a one half-mile radius of the site, while no cultural resources have been previously recorded within its boundaries.

During the field survey, BCR's archaeologists did not identify any cultural resources, including prehistoric or historic archaeological sites or historic-period buildings, within the Area K boundaries. As a result, BCR recommended that no additional cultural resources work or monitoring is necessary for proposed project activities. However, consistent with existing

mitigations, if any cultural resources are encountered during project-related ground-disturbing activities, Vulcan shall continue to retain a qualified archaeologist to assess and evaluate the find as needed.

Lastly, consistent with existing mitigations, BCR recommended that if human remains are encountered during continued mining, no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner will continue to be notified of the find immediately, and if the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). In coordination with Vulcan, the MLD may also inspect the site of the discovery within 48 hours of notification by the NAHC.

Based on a review of the Project, as well as the findings presented in BCR's 2021 Cultural Resources Assessment, through continued implementation of the existing cultural resource mitigations summarized above, no new or greater impacts to cultural resources would result when compared to the impacts address in the 1993 EIR and 2020 EIR. See BCR's 2021 report in Appendix D for additional detail.

3.5.5 Analysis of New or More Severe Project Impacts

The Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Cultural Resources.

The 1993 EIR assessed impacts to the entire Specific Plan Area, and the 2020 EIR assessed impacts to the entire Area Q Quarry. These analyses cover the entire Project site. Additionally, since certification of the 1993 EIR and 2020 EIR, the Cajon Creek and Area Q Quarries have been disturbed by ongoing mining activities. To date, no cultural or paleontological resources have been uncovered by mining activities.

Since 1993 and 2020, there have been no changes to the standards of significance provided in CEQA Appendix G Environmental Checklist regarding analysis of cultural resources. The Project will not have any new or substantially greater significant cultural resources impacts not previously assessed in the 1993 EIR or 2020 EIR.

3.5.5. CEQA Appendix G Environmental Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant impact to cultural resources if the Project would:

a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?

The majority of the Project site has already been disturbed by the existing aggregate mining and processing operation. Additionally, the entirety of the Project site was previously surveyed for cultural resources as part of the 1993 and 2020 EIRs, and no cultural or historic resources or structures were found onsite. Existing conditions of approval, project design features and

mitigation measures meant to reduce potential impacts to cultural resources, including those outlined above from the 1993 and 2020 EIRs, will continue to be implemented as applicable.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?

See response above. The majority of the Project site has already been disturbed by the existing onsite mining operations, and the entirety of the Project site was previously surveyed for archaeological resources as part of the 1993 and 2020 EIRs, and none were found onsite. Existing conditions of approval, project design features and mitigation measures meant to reduce potential impacts to archeological resources, including those outlined above from the 1993 and 2020 EIRs, will continue to be implemented as applicable.

c) Disturb any human remains, including those interred outside of dedicated cemeteries?

See response above. The majority of the Project site has already been disturbed by the existing onsite mining operations, and the entirety of the Project site was previously surveyed as part of the 1993 and 2020 EIRs, and no human remains were found. Consistent with existing conditions of approval, project design features and mitigation measures, if human remains are encountered during the Project, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98, and the Project would continue to result in a less than significant impact.

3.5.6 Addendum Conclusions

The Cultural Resources evaluations in the 1993 EIR and 2020 EIR and the conclusions adopted with their certification remain accurate and are unchanged by this Addendum. The Project will not have any new significant cultural resources impacts not previously assessed in the 1993 EIR or 2020 EIR. All previously identified conditions and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?	Less than Significant	Less than Significant Impact with Mitigation Incorporated	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?	Less than Significant	Less than Significant Impact with Mitigation Incorporated	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	Less than Significant Impact with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.6 ENERGY

A detailed discussion of energy has been scoped out from this Addendum. The current CEQA Appendix G Environmental Checklist notes that a project would have a potentially significant impact related to energy if the project would:

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The total energy consumed by the Project would not change or increase. The primary sources of energy consumed onsite would continue to be fuel (diesel and gasoline) and electricity due to onsite equipment activity, off-road equipment, and conveyors and processing plants. Because the rate of aggregate mining and processing, as well as the mining methods, the number and types of equipment, and the number of onsite employees, and the number of haul trucks would not change or increase because of the amended Project, the amount of fuel and electrical energy consumed would not change or increase. Consequently, the Project would not result in any new energy demand.

Further, Vulcan would continue to ensure engines operating onsite are certified in accordance with appropriate state and federal regulations. This would also ensure that efficiency of mobile equipment and vehicles would continue to improve, as applicable, over the life of the Project through compliance with increasingly stringent standards adopted by applicable regulatory agencies. The Project would continue to utilize the best available equipment throughout the life of the Project in order to improve diesel fuel efficiency, in accordance with the State of California Energy Efficiency Strategic Plan (CPUC, 2011). Equipment that uses energy would implement modern design and technology to maximize efficiency improvements.
For these reasons, the Project would not create any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to energy when compared to those previously evaluated and disclosed within the 1993 EIR and the 2020 EIR.

3.7 GEOLOGY AND SOILS

3.7.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.7.6, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect on geology and soils as a result of the Project, when compared to the findings in the previous EIRs. The following two sections summarize the conclusions from those EIRs followed by the addendum analysis and findings.

3.7.2 1993 EIR Conclusions

The 1993 EIR performed an evaluation of Geology and Soils and looked at potential impacts associated with the Specific Plan due to faulting and ground breakage, ground shaking, liquefaction, slope stability, and subsidence, as well as threats to groundwater. (Draft 1993 EIR, pgs. 4-35 – 4-44; Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 11-13.) A geotechnical investigation was conducted by Woodward-Clyde Consultants in 1990 that evaluated potential geologic and groundwater hazards associated with the project and recommended mitigation to avoid those hazards. The investigation concluded that there were no significant impacts associated with subsidence, liquefaction, faulting, or ground breakage. Potentially significant impacts were identified related to ground rupture, ground shaking, groundwater quantity and quality, and slope stability, but the 1993 EIR concluded that these potential impacts can all be reduced below a level of significance with mitigation.

The mitigation measures adopted as part of the 1993 EIR certification include the following:

- Site development plans will not include the construction of habitable structures within the designated Alquist-Priolo Special Study zones, therefore the investigative mitigations called for in the regulation are not necessary.
- Human occupancy structures shall be designed to conform to all applicable standards and guidelines including (but not limited to) appropriate local building codes and the Uniform Building Code.
- Although the potential for impacts is considered to be less than significant, site specific geotechnical studies shall be conducted for individual buildings to further evaluate liquefaction potential. If liquefaction susceptible areas are identified, mitigation for proposed buildings would include enhanced design, remedial grading, and/or relocation of planned structures.
- In the event of temporarily exposed groundwater within deep mining areas, mining will be temporarily suspended within those immediate areas. However, no mitigation is warranted for short-term loss of groundwater to evaporation, as it is not expected to significantly affect groundwater resources.
- All slope design, cuts and fills, erosion control, surface and subsurface drainage shall conform to the recommendation of the geotechnical consultant. Slope failure will be controlled by reducing the angle of finished slopes, stabilizing the surface by establishing

a suitable ground cover and by providing adequate setbacks. This potential impact will be mitigated to a level of insignificance through site design, operation and reclamation.

(Final 1993 EIR, pgs. ES-17 – ES-20.)

3.7.3 2020 EIR Conclusions

The 2020 EIR performed an evaluation of Geology and Soils and looked at potential impacts associated with the Area Q Quarry due to seismic and seismic related hazards, soil erosion and topsoil removal, slope stability, and paleontology and unique geologic features. (Draft 2020 EIR, pgs. 3.5-1 – 3.5-30; Final 2020 EIR, pg. 1-7.) A geotechnical analysis evaluated potential geologic and groundwater hazards associated with the project, project design features incorporated in the project and recommended mitigation to avoid potential those hazards.

As discussed in the 2020 EIR Section 2.4.13, numerous design features, BMPs, operating practices and other environmental protection measures were incorporated into the project to minimize potential impacts on the environment. The following identifies some of the environmental protective measures and project design features that were incorporated into the 2020 EIR:

- The Project site would be designed to address stormwater runoff and drainage as described in the Drainage Report (Appendix H of the 2020 EIR) prepared by Sespe Consulting, Inc. (2019), and per the BMPs identified in the Storm Water Pollution Prevention Plan (SWPPP).

- The mine plan includes a maximum pit depth well above the water table, and therefore mining would not pose a risk to groundwater quality.

- The design slope configurations were evaluated under both static and pseudo-static conditions and would be stable according to appropriate factors of safety.

- Mining and reclamation activities would occur outside of the Cajon Creek drainage and would not change drainage patterns or induce soil erosion.

- Topsoil would be stored on site (within the berm) for future use during site reclamation in accordance with the Project's Surface Mining and Reclamation Plan.

(Draft 2020 EIR, Section 3.5.5.3, pg. 3.5-24.)

The evaluation concluded that there were no significant impacts associated with soil erosion and topsoil removal and slope stability. Potentially significant impacts were identified related to seismic and seismic related hazards and paleontology and unique geologic features, but the 2020 EIR concluded that these potential impacts could be reduced below a level of significance with mitigation. The mitigation measures adopted as part of the 2020 EIR certification included the following:

- **Mitigation Measure GEO-1:** Should there be areas along slopes where alluvial materials are loose, and/or there is evidence of dislodgement, the operator will install a soil catchment berm at least 10-feet from the toe of the slope in those areas, as needed, to prevent falling coarse materials from rolling out into the quarry bottom.

- **Mitigation Measure GEO-2:** Approximately every 12 to 18 months during active mining, a California Certified Engineering Geologist (CEG) will observe exposed cut faces of the mining operation in Area Q for evidence of the Fault, and if warranted assess the potential for surface rupture and/or slope failure.

- **Mitigation Measure GEO-3:** Site workers will be trained and instructed to stop working in the immediate area upon discovery of a vertebrate fossil. A County of San Bernardino Qualified Paleontologist will be contacted to examine the vertebrate remains and recommend and implement appropriate measures to curate the fossil materials, if warranted.

  (Draft 2020 EIR, Section 3.5.6, pgs. 3.5-29 – 3.5-32.)

3.7.4 2022 Geotech Reports

Geotechnical evaluations have been prepared to evaluate the potential impacts associated with the changes proposed by the Project as compared to the projects evaluated in the previous EIRs. These include the Haley & Aldrich, Inc. Geotechnical Evaluation (2022) and the Haley & Aldrich CEQA Geology and Soils Screening Assessment (2022). The following summarizes Haley & Aldrich's field data collection and provide their interpretation of the subsurface data based on current and previous investigations. Specifically, Haley & Aldrich concluded the following:

> "Based on our evaluation of the subsurface conditions at the site, we conclude that excavation of quarry pits to a total depth of 240 feet below original surface grades at Cajon Creek Quarry Areas K, L, M, and Q and to a total depth of 120 feet below original surface grade at the northern portion of Area N is geotechnically feasible, imposing low risk of geotechnical impacts to neighboring properties and improvements. This conclusion is based on slopes with a design inclination of 2:1 (horizontal to vertical). Slope stability analyses indicate that the proposed quarry slopes have static factors of safety ranging from 1.5 to 1.9, which are considered acceptable for the proposed project design features and meet the standard of practice definition for stable slope configurations. Pseudo-static analyses performed using the Bray & Macedo (2019) procedure indicate that the proposed quarry slopes are expected to experience seismic-induced displacements of up to about 2.4 to 3.9 feet (84-percent confidence level) following the design-level seismic event. Our analyses show that these slope movements are expected to be confined to the quarry site and are not expected to impact offsite properties or improvements."

(Haley & Aldrich (2022), pg. 25.)

3.7.5 Analysis of New or More Severe Project Impacts

The Project would not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Geology and Soils.

The Project proposes mining in new areas (i.e., Areas K and N) and an increase in the maximum permitted depth of mining from 120 feet bgs to 240 feet bgs. No other changes to the proposed mining or reclamation design are proposed. To determine if these changes from the previous EIRs would result in a new or more severe significant environmental effect, Haley & Aldrich prepared a Geotechnical Evaluation and a CEQA Geology and Soils Screening Assessment for the Project (see Appendix E). As discussed above in Section 3.7.4 above, Haley & Aldrich reviewed geological reports, performed site reconnaissance and geologic mapping, collected data and observed site conditions, performed subsurface and slope stability analyses, and collected samples and laboratory testing. The Haley & Aldrich reports include recommendations regarding soil and groundwater conditions at the site, seismicity and seismic hazards, slope stability analysis, criteria for fill quality and compaction, seismic design parameters, and mine operational conditions.

From a geotechnical and geologic standpoint, the results of the Haley & Aldrich evaluation indicate that the Project's excavation of quarry pits to a total depth of 240 feet below ground surface at Areas K, L, M, and Q, and to a total depth of 120 feet below ground surface at the northern portion of Area N is geotechnically feasible, imposing low risk of geotechnical impacts to neighboring properties and improvements. This conclusion is based on slopes with a design inclination of 2:1 (horizontal to vertical). Slope stability analyses indicate that the proposed slopes have static factors of safety ranging from 1.5 to 1.9, which are considered acceptable for the proposed project design features and meet the standard of practice definition for stable slope configurations for the proposed end use. The analysis shows that slope movements associated with seismic activity are expected to be confined to the quarry site and are not expected to impact offsite properties or improvements.

3.7.6 CEQA Appendix G Environmental Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant impact to geology and soil resources if the Project would:

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
- *i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?*
- *ii) Strong seismic ground shaking?*
- *iii) Seismic-related ground failure, including liquefaction?*
- *iv) Landslides?*

The consolidation of the Cajon Creek Quarry and the Area Q Quarry would not create a change that would alter the findings of the previous EIRs in relation to seismic concerns. See discussions below, as well as Haley & Aldrich's technical reports in Appendix E, for additional detail.

Seismic

The 2022 Haley & Aldrich geotechnical report includes a discussion of local and regional faults which is consistent with the seismic discussions in the previous EIRs. The following is a summary of the updated reports.

The Glen Helen Fault (part of the San Jacinto Fault zone) trends through the southwestern tip of the Project site. The State of California has delineated a Special Studies Zone offset from this fault, as shown on "State of California, Special Studies Zones, San Bernardino North Quadrangle, Official Map," dated 1 July 1974. The Glen Helen Fault trace is not well-defined near the south portion of the Project site. However, the City and County of San Bernardino Department of Building and Safety considers the concealed fault trend of the Glen Helen Fault a Holocene Fault and suggests that this strand is the most active portion of the San Jacinto Fault system. Although the inferred Glen Helen fault trace may not be present at ground surface, it could be found at depth, so it is possible that new quarry slopes could expose the fault during planned mining activities.

Geologic mapping performed by Morton and Miller (USGS, 2006) indicates that a second concealed fault may cross through a portion of the site, including the southern tip of Area M and portions of Areas N and Q. However, this fault branch is not associated with a State of California Special Studies Zone.

During a major earthquake, very strong to severe shaking has the potential to occur at the Project site. A probabilistic seismic hazard analysis (PSHA) was performed using the USGS (https://earthquake.usgs.gov/hazards/interactive/). The disaggregation analysis utilized the USGS Dynamic Conterminous U.S. 2014 (v.4.2) edition. For this analysis a shear wave velocity over the top 100 feet (30 meters) of the site (V_{S30}) of 360 meters per second was used. Based on the seismicity of faults that may impact the Project site and the results of the disaggregation analysis, a design earthquake with a Moment Magnitude (M_W) of 7.7 was selected for the seismic hazard evaluation. The peak horizontal ground acceleration (PHGA), which is based on the Maximum Considered Earthquake (MCE) with a return interval of 2,500 years, or a 2 percent probability of exceedance in 50 years, is 1.63g. The risk- based site-modified peak ground acceleration (PGAM) is 1.195g; this value was computed based on procedures outlined in American Society of Civil Engineers (ASCE) 7-16. The hazard from strong seismic ground shaking is expected to be "less than significant," based on the intended use of the site as an aggregate mine.

Liquefaction

Liquefaction is the process in which saturated, cohesionless soil experiences a temporary loss of strength due to the buildup of excess pore water pressure during cyclic loading resulting from earthquake ground motions. The type of soils most susceptible to liquefaction are loose, clean, saturated, uniformly graded sand and silt that have low clay content. The soil at the Project site

consists of fine to coarse sand, gravels, and cobbles with some silt and clay; when saturated, these soil types have potential to be susceptible to liquefaction. However, based on the findings in the Haley & Aldrich geotechnical report, the soil profile at the proposed Project excavation depth of approximately 240 feet below ground surface (bgs) consists of very dense and non-liquefiable granular soils.

Landslides

Haley & Aldrich performed a stability analysis of the proposed 240-foot-high quarry slopes using RocScience Slide 7.0. The slopes proposed of the Project would remain the same as in the previous EIRs, at a maximum inclination of 2:1 (horizontal: vertical. Regardless, Haley & Aldrich analyzed the slope configuration to determine static and pseudostatic (seismic) factors of safety for soil slopes by means of limit-equilibrium analysis. Final reclaimed slopes with an inclination of 2:1 are in conformance with SMARA's prescriptive standards for slope stability (14 Cal. Code Regs., § 3704(d)). Slope stability analyses indicate that the proposed quarry slopes have static factors of safety ranging from 1.5 to 1.9, which are considered acceptable for the proposed Project design features and are considered stable slope configurations for the Project's proposed end use of open space. Pseudo-static analyses performed in combination with the Bray and Macedo procedure indicate that the proposed quarry slopes are expected to experience seismic-induced displacements of up to about 2.4 to 3.9 feet (84 percent confidence level) following the design-level seismic event. The failure surfaces associated with these displacements are not expected to significantly impact existing or proposed onsite or offsite improvements given the nature of the use and the proposed end use of open space. The hazard from landsliding is expected to be "less than significant," as the calculated factors of safety for the proposed slopes are acceptable based on California Geological Survey Special Publication 117A, and calculated pseudostatic displacements are not expected to significantly impact existing or proposed onsite or offsite improvements. These findings are consistent with the findings of the previous EIRs.

b) Result in substantial soil erosion or the loss of topsoil?

Consistent with the Cajon Creek Quarry and Area Q Quarry, project design feature, best management plans (BMPs), applicable mitigation measures would continue to be implemented to control soil erosion. Current SMARA regulations also require the control of soil erosion as well as stockpiling the topsoil prior to excavation of the aggregate. Topsoil stored in the perimeter berms would be used during reclamation. These aspects of the Project would not change from what was previously evaluated and approved during the previous EIRs. As such, the Project would not add a new significant environmental effect or increase the severity of a previously identified environmental effect.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

The Project is the consolidation of the existing cajon Creek Quarry and the Area Q Quarry, therefore the Project site is the same as what was evaluated in the previous EIRs. The geological

unit would not change. The Project would not add a new significant environmental effect or increase the severity of a previously identified environmental effect.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

The Project is the consolidation of the existing Cajon Creek Quarry and the Area Q Quarry, therefore the Project site is the same as what was evaluated in the previous EIRs. The Project would not add a new significant environmental effect or increase the severity of a previously identified environmental effect.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

Septic tanks or alternative wastewater disposal systems have not and would not be used at the Project site or in the final use of the site as open space.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

The Project would increase the depth of the excavation from 120 feet below original surface grades to 240 feet below original surface grades.

The summary that follows is taken from a letter dated 3 April 2018 from Dr. Samuel McLeod of the Los Angeles County Natural History Museum regarding vertebrate paleontology resources at the site that was included in Haley & Aldrich's CEQA Geology and Soils Screening Assessment:

> The site surface sedimentary deposits consist of late Holocene alluvial deposits in an active wash environment which has been shaped by both deposits and erosion during large rainstorms and corresponding flood events. These deposits are not unique to the site; elsewhere, these deposits typically do not contain significant vertebrate fossils. If mining proceeds to underlying older Quaternary sedimentary deposits (at an unknown depth), it is possible remains of fossil vertebrates may be encountered, as have been found at sites a significant distance (approximately 15-20 miles) south-southwest of the Project site. Should vertebrate fossils be encountered during mining, Haley & Aldrich recommends the following: (1) cease further excavation in the immediate area; (2) assess the vertebrate fossil material using a qualified paleontologist; and (3) implement recommendations of the qualified paleontologist, if applicable. (Haley & Aldrich's recommendation was incorporated into the 2020 EIR Mitigation Measure GEO-3). In addition, the Project site boundary does not contain sedimentary deposits unique to the surrounding area. There are no unique geological resources present on-site.
>
> (Appendix D-2, pg. 6)

Because the nearest remains of fossil vertebrates were found approximately 15 to 20 miles south-southwest of the Project site, and because the types of sediment deposits at the Project site do not

typically contain vertebrate fossils, there is not an increased likelihood that paleontological resources will be encountered at lower depths. As a result, with the implementation of the 2020 EIR MM GEO-3 (see Section 3.7.3), increasing mining depth from 120 feet bgs to 240 feet bgs would have a "less than significant impact" with respect to paleontological resources or site specific unique geologic features.

The Project would not add a new significant environmental effect or increase the severity of a previously identified environmental effect.

In reviewing potential Geology and Soils impacts from the Project in relation to the thresholds included in the above CEQA Guidelines Appendix G criteria, Haley & Aldrich determined that any potential impacts associated with seismic and seismic related hazards, soil erosion and topsoil removal, slope stability, and paleontology and unique geologic features would remain less than significant.

3.7.7 Addendum Conclusions

The 1993 EIR and 2020 EIR determined that, with mitigation, there would be no potentially significant impacts associated with geology or soils and the conclusions adopted with certification of the 1993 EIR and 2020 EIR remain accurate and are unchanged by this Addendum. The Project will not have any new significant geologic and soil erosion impacts not previously assessed in the 1993 EIR or 2020 EIR. All previously identified conditions and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42. ii) Strong seismic ground shaking? iii) Seismic-related ground failure, including liquefaction? iv) Landslides?	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
b) Result in substantial soil erosion or the loss of topsoil?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	Generally Suitable/Less than Significant Impacts	Generally Suitable/Less than Significant Impacts	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	No Impact	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	No Impact	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	Less than Significant Impact with Mitigation Incorporated	Less than Significant Impact with Mitigation Incorporated	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.8 GREENHOUSE GAS EMISSIONS

3.8.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.8.5, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect related to greenhouse gas emissions when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the addendum analysis and findings.

3.8.2 1993 EIR Conclusions

The 1993 EIR did not include an analysis of the impact that the Specific Plan would have related to greenhouse gas emissions. This analysis was not required in 1993 as a part of the CEQA Appendix G Guidelines or legislation in effect at that time.

3.8.3 2020 EIR Conclusions

GHG emissions from the Area Q project were estimated as part of the 2020 EIR. It was determined that the incremental GHG emissions due to mining and ancillary operations at the Area Q Quarry was approximately 45 metric tons of carbon dioxide equivalent per year (CO2e MT/year), well below the applicable SCAQMD screening threshold for GHG emissions utilized at that time (i.e., 10,000 CO2e MT/year). Because the GHG emissions associated with the project were below applicable SCAQMD screening threshold, the 2020 EIR determined that the Area Q Quarry would not result in significant impacts associated with GHG emissions.

3.8.4 Analysis of New or More Severe Project Impacts

The Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Greenhouse Gas Emissions.

As discussed previously, the Project will continue existing operations in both currently permitted and new areas at the same pace and intensity as analyzed in the prior EIRs. No changes are proposed to mining methods, processing operations, annual production, or phasing.

The Project would use the existing equipment or equipment types that have been in operation at the Cajon Creek and Area Q quarries, including bulldozers and front-end loaders. Recovered materials would be transported by loaders and an existing extendable electrified conveyor system. Other existing mobile equipment that may be used includes a motor-grader, a water truck, and service truck. Notably, however, project equipment may utilize more efficient and cleaner engines than were analyzed in the 1993 EIR or 2020 EIR.

Sespe Consulting prepared an Air Quality and Climate Change Impact Assessment (“AQCCIA”) (Sespe Consulting, 2023) in (see Appendix B) to evaluate the Project’s potential greenhouse impacts. The AQCCIA evaluated the Project using the CEQA Guidelines Appendix G Environmental Checklist Form for Greenhouse Gases and found that Project, including mining on

Areas N and K, would not result in any new significant greenhouse impacts. GHG emissions from fuel combustion and electricity consumption would not change or increase as a result of the Project. See the updated AQCCIA in Appendix B, and the discussion below for additional detail.

3.8.5 CEQA Appendix G Environmental Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant impact to related to GHG emissions if the Project would:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

There is general agreement that only the largest conceivable projects could, by themselves, have a significant impact on the environment due to GHG emissions. However, each project resulting in an emissions increase would contribute to the cumulative impact that emissions occurring planet-wide have on global climate change. Thus, a determination of whether the Project contribution is cumulatively considerable is required to evaluate this potential impact.

As discussed above, the extraction, processing, and transport of aggregate material will not increase from what was analyzed in prior EIRs as a result of the Project. As a result, the potential impacts associated with GHG emissions will remain identical to those analyzed in the Area Q EIR and are less than significant.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Project operations would result in GHG emissions from electricity use and combustion of transportation fuels, each of which is regulated near the top of the supply-chain. As such, each citizen of California (including the operator of the Project) will have no choice but to purchase electricity and fuels produced in a way that is acceptable to the California market. Thus, Project GHG emissions will be consistent with the relevant GHG reduction plans (e.g., AB 32 Scoping Plan). The Project would meet its fair share of the cost to mitigate the cumulative impact of global climate change because Vulcan is purchasing energy from the California market. Further, because the pace and methods of mining and processing would not change or increase under the Project, the quantity of fuel and electricity consumed would also not increase compared to existing operations.

Lastly, the Project proposes continuation of existing resource recovery on Area K. The previously approved light industrial development on Area K will be replaced with this use. An anticipated 2,160 vehicle trips per day associated with the Area K light industrial development were analyzed in the Specific Plan approvals. These trips will remain unused, and banked, as within the scope of prior environmental reviews.

Thus, the Project would have a less than significant impact on applicable GHG reduction plans.

3.8.6 Addendum Conclusions

The Greenhouse Gas Section as set forth in the 2020 EIR and the conclusions adopted with certification of the 2020 EIR remain accurate and are unchanged by this Addendum. The 1993 EIR did not evaluate GHG's as it was not required at the time; however, as discussed above, because Area K would no longer be developed for light industrial, GHG emissions associated with the Project are expected to be less than the 1993 project, as many vehicle trips previously attributed to the 1993 project would be eliminated. As a result, the Project will not create significant new Greenhouse Gas Emission impacts not previously assessed in the 1993 EIR or 2020 EIR.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	N/A	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	N/A	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.9 HAZARDS AND HAZARDOUS MATERIALS

3.9.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.9.5, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect on hazards and hazardous materials resulting from the Project, when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the addendum analysis and findings.

3.9.2 1993 EIR Conclusions

The 1993 EIR evaluated potential impacts associated with the use and/or storage of hazardous materials by industrial and extractive land uses within the Specific Plan. (Draft 1993 EIR, pgs. 4-107 – 4-112; Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 21-22.) The 1993 EIR found that the operation of aggregate extraction and processing operations requires utilization of fuels, lubricants, and asphalt oil used in production of asphaltic concrete that are classified as hazardous under California law. Additionally, aggregate processing plants have the potential to generate effluent and emissions that are regulated by the Santa Ana Regional Water Quality Control Board (Region 8) and the SCAQMD.

In evaluating the potential impacts associated with use and/or storage of hazardous materials such as fuels, lubricants, and asphalt oil, the 1993 EIR found that the following requirements set forth in the California Administrative Code would apply:

- All underground fuel or oil storage tanks and piping will be double-walled and contain leak detection equipment, overfill and spill protection. No bulk storage of fuels or oils in the effective 100-year floodplain will be permitted. Valid operating permits will be obtained from the County Hazardous Materials Management Division (HMMD).

- Waste oil tanks will be emptied on a regular basis by an oil recycler.

- Above-ground storage tanks will be protected by a containment berm to provide protection in the event of a spill. The containment berm shall be capable of holding 150 percent of the combined capacities of the tanks.

- Fuel dispensing areas will contain spill catchment features.

- Greases and lubricating oils will be stored in drums on a concrete pad having spill containment.

- Solvents will only be used for parts cleaning and will be kept in a fully contained system that recycles spent solvent.

- Liquid concrete additives, where possible, will be purchased in bulk quantities in order to reduce the number of containers on site at any given time; these materials will be stored separately from petroleum products, in an area having spill containment.

- Calmat will self-insure its financial responsibility for accidents and spills, clean ups and damages to third parties, as required by the EPA.

- A Business Plan will be developed in compliance with Chapter 6.9S of the California Health and Safety Code to assure that emergency service personnel and employees are able to respond effectively to potential problems presented by an accident or emergency. The Business Plan will be submitted to the County of San Bernardino Health Services Risk Management Division, and to the City of San Bernardino Fire Department, at least 45 days prior to operation. A copy of the Business Plan will be maintained at the subject property.

- An Authority to Construct and Permit to Operate will be secured from the SCAQMD as required, in order to assure that proper compliance with all applicable air quality regulations is achieved.

- A Waste Discharge permit will be secured from the Regional Water Quality Control Board to assure that all water quality requirements are met.

  (Draft 1993 EIR, pgs. 4-111 – 4-112.)

The requirements above were also incorporated as mitigation measures for the onsite handling of hazardous materials.

The 1993 EIR determined that compliance with the requirements set forth in the California Administrative Code, including the requirement to develop a "Business Plan," and the requirement to obtain permits from the Regional Water Quality Control Board and SCAMQD would guard against potentially significant impacts associated with hazardous materials. (Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 21-22.)

3.9.3 2020 EIR Conclusions

The 2020 EIR evaluated potential impacts associated with the use and/or storage of hazardous materials at Area Q. (Draft 2020 EIR, pgs. 3.7-1 – 3.7-16; Final 2020 EIR, pg. 1-7.) The 2020 EIR found that the project required use of fuels and lubricants classified as hazardous under California law. Additionally, the demolition of existing structures onsite at the time would potentially generate asbestos containing materials, lead-based paint, or asphaltic and cementitious materials.

In order to minimize the potential impacts from hazardous materials identified in the 2020 EIR, the following project design features were included in the project:

- Local, state and federal regulations would be followed during the removal of structures and debris from the Project site (i.e., asbestos containing material and lead based paint regulations).

- Prior to removal of topsoil and subsoil and during mining activities, the affected area would be sprayed by water trucks, as necessary to control dust and comply with air quality regulations.

- The Project site would be designed to address stormwater runoff and drainage as described in the Drainage Plan (Appendix H within the 2020 EIR) and per the requirements of the site-specific Storm Water Pollution Prevention Plan (SWPPP).

- The Project site would be graded to prevent sediment from leaving the site.

- Equipment and vehicle parking/storage areas would be graded to prevent stormwater from leaving the site.

- BMPs (e.g., gravel bag or rock check dams along drainage swales, silt fencing or fiber rolls to contain drainage and sediment, lined swales, etc.) would be implemented to prevent stormwater runoff in accordance with the SWPPP.

- Excavation equipment would be inspected, maintained and repaired to ensure that the equipment is operating properly, and leaks are prevented to the maximum extent feasible.

- Minor/routine maintenance and fueling activities conducted on-site would be done in accordance with the BMPs identified in the SWPPP, and the controls and countermeasures specified in the site Spill Prevention, Control, and Countermeasure (SPCC) plan.

- Major maintenance and repairs of equipment and vehicles would be conducted off-site.

- Hazardous materials and hazardous waste would be managed in accordance with applicable local, state and federal regulations. Any hazardous waste generated at the site would be disposed of at a permitted off-site facility.

- Personnel would be trained in surveillance and control of mosquitoes in case there is standing water after storm events.

- Blasting would not be used for the proposed mining operations.

  (Draft 2020 EIR, pgs. 3.7-8 – 3.7-9.)

Due to the project design components listed above, the 2020 EIR found that the Area Q Quarry would not have the potential to result in significant impacts associated with hazardous materials and that no mitigation measures were required. (Final 2020 EIR, pg. 1-7.)

3.9.4 Analysis of New or More Severe Project Impacts

The Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Hazards or Hazardous Materials.

The Project seeks to continue operations in both existing permitted and new areas at the same pace and intensity as analyzed in the prior EIRs. No changes are proposed to mining methods, processing operations, annual production, or phasing. As such, there be no change in the type or quantity of hazardous materials used or hazardous wastes generated onsite.

Because there is no change in the character of mining and processing activities at the site, and because all hazardous materials-related mitigation measures and project design features analyzed in the 1993 and 2020 EIR will remain in place, the Project will not result in new hazardous materials impacts than were previously considered in the prior EIRs.

Since 1993 and 2020, there have been no changes to the standards of significance provided in CEQA Appendix G Environmental Checklist regarding analysis of hazardous materials. The Project will not have any new or substantially greater significant hazardous materials impacts not previously assessed in the 1993 EIR or 2020 EIR.

3.9.5 CEQA Appendix G Environmental Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant impact related to hazards and hazardous materials if the Project would:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

As noted above, because onsite mining and processing operations would not change as a result of the Project, the type and/or quantity of hazardous materials used onsite would not change or increase. Diesel, gasoline and/or lubricating oil would continue to be present within equipment and vehicles operating on-site. Additives would continue to be used at the processing facilities. Any hazardous materials used onsite would continue to be stored within secondary containment, and Vulcan will continue to use BMPs as necessary. As such, there would be no new impacts related to the use, transport or disposal of hazardous materials as a result of the Project.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

See response to question a) above. As only minimal amounts of hazardous materials would continue to be used or stored onsite, the potential for an accidental release of significant quantities of hazardous materials that could impact the surrounding environment would remain low. Existing spill containment BMPs would continue to be implemented onsite. For these reasons, an accidental release of hazardous materials that could impact the surrounding environment would remain unlikely, and the Project would have no new impacts.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

The Project site is not within 0.25 miles of an existing or proposed school. As was the case in 2020, the nearest school remains the Vermont Elementary School located in the unincorporated community of Muscoy approximately 0.4 miles southeast of the Project site.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

As noted in the 2020 EIR, the Project site is located within the boundaries of the Source Operable Unit (OU) of the United States Environmental Protection Agency (USEPA) Newmark Groundwater Contamination Superfund Site. However, the Project site is not part of the superfund cleanup site. Water at the Area M groundwater well has been sampled and the results reported non-detect for both perchloroethylene (PCE) and trichloroethylene (TCE), which are the constituents addressed in the Newmark cleanup (Integrated Resource Management, Inc., 2018). Because the source and quantity of groundwater used onsite would not change a result of the Project, there would be no impacts.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

The Project site is not within 2 miles of an existing public airport or public use airport. As was the case in 2020, the closest public airport/airstrip remains the Ontario International Airport, located approximately 13 miles southwest of the Project site.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

There are no adopted emergency response or evacuation plans that would be impacted by the proposed Project site because the Project would not result in an increase of vehicles on local public roadways. Employee and haul truck vehicle trips would not increase as a result of the Project, and existing ingress and egress points would have sufficient capacity to evacuate onsite employees in the event of an emergency.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

While portions of the Project site remain within a designated "Very High Fire Hazard Severity Zone (VHFHSZ)" area, none of the proposed Project changes would exacerbate wildfire risk. Conversely, the deeper excavation pits and removal of the draught-stressed vegetation within Areas K and N to accommodate mining would decrease the potential for wildfire compared to what was determined in the 1993 and 2020 EIRs. See Section 3.20 below for additional detail.

3.9.6 Addendum Conclusions

The 1993 EIR and 2020 EIR determined that there would be no potentially significant impacts associated with hazardous materials and conclusions adopted with certification of the 1993 EIR and 2020 EIR remain accurate and are unchanged by this Addendum. The Project will not have any new significant hazardous materials impacts not previously assessed in the 1993 EIR or 2020

EIR. All previously identified conditions and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Less than Significant Impact with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Less than Significant Impact with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	No Impact	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	No Impact	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	No Impact	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
h) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.10 HYDROLOGY AND WATER QUALITY

3.10.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.10.5, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect on hydrology and water quality when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs, and technical support documents, followed by the addendum analysis and findings.

3.10.2 1993 EIR Conclusions

The 1993 EIR evaluated Hydrology and Water Quality, including potential impacts associated with development within the floodplain, drainage control, shallow mining in the Cajon Creek Wash streambed, and surface water quality. (Draft 1993 EIR, pgs. 4-45 – 4-52; Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 13-14.)

The 1993 EIR determined that the Specific Plan would result in potential impacts associated with (1) flood flow hazards within the FEMA-mapped Cajon Creek 100-year floodplain due to in-stream mining, drainage of surface run-off from mining areas, aggregate processing plant sites and industrial development areas; (2) construction related water quality impacts due to sediment movement; and (3) degradation of surface water quality within and downstream from the site due to processing operations within mining operations.

Potential impacts to groundwater and groundwater quality were evaluated in the geology and soils section of the 1993 EIR, which determined that "[d]epth of excavation in Planning Areas F (75'), L (120') and M (120') are well above existing groundwater levels . . . Recharge of poor quality water into the aquifer will be avoided through drainage control. Removal and disposal of groundwater (if any) encountered during construction or excavation activities were coordinated with the local RWQCB to ensure proper disposal methods and locations." As a result, it was determined that there would be no significant impact as a result of groundwater exposure.

With respect to the potential Hydrology and Water Quality impacts identified above, the 1993 EIR states that these impacts have been eliminated or substantially lessened to a level of non-significance by project design features and mitigation measures. Furthermore, erosion control and existing hydraulic structures would facilitate both erosion and sedimentation control. The mitigation measures adopted as part of the 1993 EIR certification included the following:

- Proposed site design and drainage system plans shall be submitted for review to the City of San Bernardino. The San Bernardino County Flood Control District and the City Water Department will approve development plans with respect to adequacy of storm drain facilities as a condition of project approval. Final design shall include all requirements and recommendations provided by the agency.

- Adequate mining area and aggregate processing plant site drainage shall include the following measures:

  - Surface drainage will be diverted around the mining pits within Planning Areas F, L and M. Internal drainage will be collected at the lower end of excavation for percolation.
  - Adequate surface drainage control shall be designed for aggregate processing plant sites within Planning Areas I and N, so that erosion and sedimentation does not develop in the adjacent Cajon Creek.

- All project-related drainage facilities shall be designed to accommodate runoff associated with a 25-year flood event pursuant to requirements of the City of San Bernardino Public Works Department.

- Final design specifications shall include a schedule for regular maintenance of all drainage facilities to ensure proper working condition.

- Discharge of surface runoff, whether from storm drains or diversions from pit areas, are subject to Stormwater Discharge Permits from the RWQCB.

- Erosion control measures described in the project design shall be inspected after emplacement by a qualified engineering or hydrological consultant to insure proper working condition.

- Erosion control measures associated with the proposed project shall include the following:
  - Implementation of the Revegetation Plan, required in accordance with the Reclamation Plan, which provides for hydroseeding all disturbed areas.

- Recommendations on the design and location of all drainage facilities provided during geotechnical or hydrological observations of grading and construction activities shall be incorporated into final project design.

- Process water from plants in Planning Areas D and N will be reclaimed and re-used by means of settling ponds and a recirculating system.

- All facilities subject to flooding damage shall be located outside of the 100-year floodplain or otherwise protected per direction of the project engineering, geotechnical, or hydrological consultants, and the City of San Bernardino Public Works Department.

  (Draft 1993 EIR, pgs. 4-50 – 4-52.)

With respect to water supply, the 1993 EIR assumed that the Cajon Creek Quarry would use approximately 371,300 gallons per day of water that would be supplied either by the City or by a private on-site well. (Draft 1993 EIR, pgs. 4-117 – 4-119.)

The following measures were identified to reduce any potential impacts associated with providing water services to the Specific Plan:

- To reduce incremental region- wide impacts to water supply to San Bernardino County, conservation measures shall be implemented; i.e., the Specific Plan Design Guidelines identifies the use of xerophytic (drought-tolerant) plants for landscaping.

- Reclaimed water shall be used in aggregate processing operations where feasible. The use of reclaimed water is provided for in the Conservation Element of the City of San Bernardino General Plan and is incorporated into the project as a provision of the Specific Plan. Aggregate processing wastewater shall be clarified onsite and recycled.

  (Draft 1993 EIR, pgs. 4-125 – 4-126; Final 1993 EIR, pgs. ES-41 – ES-44.)

Based on these requirements, the 1993 EIR determined that there would be no potential significant impacts associated with the provision of water services to the Specific Plan.

3.10.3 2020 EIR Conclusions

The 2020 EIR evaluated Hydrology and Water Quality and looked at potential impacts associated with water quality, groundwater, erosion and siltation, flood hazard or inundation, and groundwater plans. (Draft 2020 EIR, pgs. 3.8-1 – 3.8-24; Final 2020 EIR, pg. 1-7.)

A drainage report was prepared by Sespe Consulting, Inc., a geotechnical evaluation was conducted by Haley and Aldrich, and a Water Use Report and Water Supply Assessment were prepared to evaluate groundwater and water quality impacts as part of the 2020 EIR. The drainage report, geotechnical evaluation, and Water Supply Assessment considered the following project design features as part of its investigation:

- The Project site would be designed to address stormwater runoff and drainage as presented in the mining and reclamation plot plans, Drainage Report, and in accordance with the Industrial General Permit (IGP) and applicable County stormwater program requirements.

- The Project site would be graded to prevent sediment from leaving the site.

- Loading and unloading of materials would take place in designated areas that would be designed to prevent stormwater runoff from leaving the site.

- Equipment and vehicle parking/storage areas would be graded to prevent stormwater from leaving the site.

- BMPs (e.g., gravel bag or rock check dams along drainage swales, silt fencing or fiber rolls to contain drainage and sediment, lined swales, etc.) would be implemented to prevent, where needed to prevent impacts to stormwater quality in accordance with the Project SWPPP.

- Excavation equipment would be inspected, maintained and repaired to ensure that the equipment is operating properly and leaks are prevented to the maximum extent feasible.

- Minor/routine maintenance and fueling activities conducted on-site would be done in accordance with the BMPs identified in the SWPPP.
- Major maintenance and repairs of equipment and vehicles would be conducted off-site.

- All hazardous materials and hazardous waste would be managed in accordance with applicable local, state and federal regulations. Although not anticipated, should any hazardous waste be generated at the site, it would be disposed of at a permitted off-site facility.

- The berm along the southern boundary of the Project site would be planted with a vegetation cover or would be protected by other equally effective means if necessary, to prevent water and wind erosion.

- In the unlikely event that an abandoned underground storage tank is discovered, the County would be notified and the tank would be removed in accordance with applicable regulations and requirements.

  (Draft 2020 EIR, pgs. 3.8-16 – 3.8-17.)

The 2020 EIR assumed that water for the project would be sourced from an existing private groundwater well located within the Cajon Creek Quarry (Area M supply well) that provides water supplies for existing mining activities. A Water Supply Assessment prepared for the 2020 EIR determined that the relocation of mining activities from Area L to the Area Q Quarry would result in no change or increase in the water currently used for mining activities (dust suppression, landscaping, and revegetation activities) in Area L (19.5 acre-feet per year).

The geotechnical evaluation prepared by Haley and Aldrich in 2020 evaluated groundwater levels and potential impacts to groundwater from the Area Q Quarry. At that time, the geotechnical evaluation stated that groundwater levels at a well 200-feet south of the Area Q Quarry ranged between 217 to 283 feet below-ground-surface over a six-year period.

Based on the technical studies discussed above, the 2020 EIR concluded that there were no significant impacts associated surface runoff, groundwater quality, water supply, erosion and siltation, flood hazards, or groundwater plans and that no further mitigation was required. (Final 2020 EIR, pg. 1-7.)

3.10.4 Technical Reports and Investigations

2023 Water Supply Assessment

A Water Supply Assessment (WSA) was prepared in 2023 by Sespe Consulting for the Project (see Appendix F) to determine how water use would compare to the projects that were previously analyzed. Water for the Project would continue to be supplied by the Area M supply well that was analyzed in the 2020 EIR. The WSA determined that water supply for the mining activities associated with the Project would remain consistent with the water use that was analyzed for the Area Q Quarry (19.5 acre-feet per year). The Area M supply well extracts water from a groundwater source that is referred to as the San Bernardino Basin Area (SBBA) and is within the boundaries of the San Bernardino Valley Municipal Water District (SBVMWD). SBVMWD and the eastern Municipal Water District manage the SBBA pursuant to a groundwater adjudication referred to as the "Western Judgment." SBVMWD prepared the Upper Santa Ana River Watershed Integrated Regional Urban Water Management Plan (IRUWMP) that states that there are sufficient

water supplies available in the SBBA to meet anticipated water demand between 2025 and 2045, including single dry and multiple dry years. As a result, the continued use of approximately 19.5 acre-feet per year of water use associated with the Project would not result in a new significant impact or increase in the severity of a previously identified impact from the 2020 EIR.

2021 Hydrogeologic Investigation Report

A Hydrogeologic Report was prepared by Sespe Consulting, dated September 27, 2021, to determine if the proposed maximum design depth of 240 feet bgs could be achieved without encountering groundwater (see Appendix F). The Hydrogeologic Report summarizes existing groundwater information, including flow models and local groundwater elevation data, which was used to prepare a conceptual hydrologic model for the Project site and immediate surroundings. The conceptual hydrogeologic model was prepared to delineate groundwater conditions in relation to known hydraulic barriers located beneath the Project site. The hydrogeologic model was then tested and refined based on a site-specific groundwater study, specifically advancing two exploratory boreholes in Areas L and M to delineate groundwater conditions in relation to known hydrologic barriers (faults) mapped within and along the western edge of the Project site. The Hydrogeologic Report determined that groundwater is present at a depth lower than 260 feet bgs throughout the Project site. As a result, the report concluded that the Project's excavation of quarry pits to a total depth of 240 feet bgs at Cajon Creek Quarry Areas K, L, M, and the Area Q Quarry, and to a total depth of 120 feet bgs at Area N, would not expose groundwater or result in any new impacts to the groundwater source underlying the Project site.

In order to evaluate whether the Project could result in sustained groundwater exposure from future changes in groundwater conditions, the report examined and summarized predictive models to assess and identify the range of typical basin-scale fluctuations and forecasted long-term trends. Based on existing data and basin inflow/outflow parameter, fluctuations in groundwater levels for the Bunker Hill Groundwater Basin that encompass the Project site are generally plus/minus 20 feet. However, while this range may be considered as typical for future groundwater level variations at the basin scale, accounting for the effects of climate change, levels are projected to decline over the life of the Project, as analysis demonstrates that precipitation will continue to decrease while atmospheric temperatures increase, resulting in a decrease in natural recharge to the aquifer. Therefore, the observed groundwater levels recorded within the hydrologic study are expected to further decrease within the Project site, and as such exposure of groundwater by sustained inundation in mining pits and consequential loss by evaporation is not anticipated.

The Hydrogeologic Investigation Report determined that increased mining depths would not have any substantial impacts on groundwater.

2022 Drainage Report

A Drainage Report was prepared by Sespe Consulting, dated May 2023, to determine whether the proposed Project would necessitate changes to the previously evaluated drainage plans. As identified in the San Bernardino County Hydrology Manual, the goal of the County of San Bernardino is to provide 100-year return frequency flood protection. The Surface Mining and Reclamation Act (SMARA) regulations also require surface mining and reclamation activities to

be conducted in such a way to protect both on-site and downstream beneficial uses of water. In addition, erosion and sedimentation control is necessary during all phases of construction, operation, reclamation, and final closure of the mine. Per SMARA requirements, erosion control methods on site must be designed to handle runoff from no less than the 20-year, 1-hour storm. Vulcan also maintains a storm water pollution prevention plan (SWPPP) for the existing mining operations which would be updated after Project implementation, and the SWPPP's storm water best management practices (BMPs) would continue to be implemented to improve storm water quality on-site.

The Drainage Report addressed the following Project designs in relation to potential drainage concerns:

- Drainage criteria for diversion of runoff from disturbed, active, non-reclaimed, and reclaimed mining areas into adjacent mining pits using perimeter berms and Best Management Practices (BMP) to control erosion and scouring of receiving drainages;
- Segregation of runoff between disturbed areas such as access roads and parking areas, and undisturbed areas; and
- Routing of runoff into the open pits such that, to the extent feasible, runoff from the Project area is diverted from areas outside the limits of disturbance.

The report identified the tributary watershed to the Project site, the floodplains that could impact the Project site, onsite runoff volumes and pit inundation depth after reclamation of the Project site, and the potential impacts of the Project related to drainage.

The drainage evaluation addressed the site following conditions:

- ***Rainfall***: Precipitation values were sourced from National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Volume 6, Version 2, Precipitation Frequency Data Server (PFDS). The precipitation values of the design storm frequencies were obtained from the San Bernardino County Hydrology Manual (100-year, 1-hour; and 100-year, 24-hour) and SMARA (20 year, 1-hour) regulatory requirements. A 25-year, 1-hour storm frequency precipitation depth was used as a conservative substitute for the 20-year, 1-hour due to the lack of available data for the 20-year, 1-hour storm.

- ***100-Year FEMA Floodplain***: According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 06071C7940J, (Effective Date - September 2, 2016), the Project site is impacted by a Zone A and Zone X floodplain. Zone A is identified by FEMA as areas subject to inundation by the 1% (100-year) annual chance of flood. Zone X is identified by FEMA as areas of 0.2% (500-year) annual chance of flood; areas of 1% (100-Year) annual chance of flood with depths of less than 1 foot or areas with drainage areas less than 1 square mile; and areas protected by levees from 1% (100-year) annual chance of flood.

  Although floodplain maps have generally changed in the City and County as a result of nationwide levee "decertification" following gulf hurricanes, the Project remains protected

from actual flooding damage as a properly engineered non-residential structure (mining and processing).

- ***Soil Types and Runoff Curve Numbers***: Soil types were sourced from the Natural Resources Conservation Service (NRCS) online web soil survey.

The Project site is not expected to receive significant local run-on from the surrounding properties due to the existing topography and surrounding land uses. A small area north of the Cajon Creek Consolidated Quarry is expected to contribute run-on to the Project site during large storm events. As described previously, Muscoy Groin No. 3 has been designed to direct flows from Cajon Creek away from the Cajon Creek Consolidated Quarry. The Devil Creek Diversion Channel directs storm flows from Cajon Boulevard to the east away from the Project site. Historical aerial photography suggests that low to moderate rain events rarely discharge to Devil Creek Diversion Channel and are primarily captured in low areas on the site, where water evaporates or infiltrates into the ground.

The Project would ultimately result in the reduction of runoff from the Project site. At the completion of mining and post-reclamation, the Project area would result in two lowered, consolidated mining pits that would retain on-site rainfall.

As identified in a previous analysis by Chang Consultants, the Devil Creek Diversion Channel is sized to contain flows from a 500-year storm event. Therefore, the 100-year storm and greater flows will be contained within the Devil Creek Diversion Channel and will have no impact on operations in the Project site.

No new encroachment into the surrounding water bodies (e.g., Cajon Creek or Devil Creek Diversion Channel) or existing floodplain is planned during the Project. Local drainage within the mining operation would be collected in the excavated pits and would not be released to the Devil Creek Diversion Channel.

To control erosion of the earthen berms along the southern and eastern boundary of the site, Vulcan would continue to install and maintain, as needed, the BMPs identified in the facility's SWPPP to reduce erosion and discharge of sediment from the site until vegetation is established on the perimeter berms. Erosion control methods implemented at the site must be designed to handle runoff from not less than the 20-year, 1-hour storm.

The bottom of the consolidated pit areas would retain all storm water from the onsite storm events modeled in the Drainage Report.

After the completion of mining, the proposed mining pits as well as the run-on area to the north would not contribute to off-site flow. The formation of the mining pits would provide two storage basins capable of capturing the full extents of the modeled storm events. Due to the small tributary area and nature of the soil, debris flows are anticipated to be negligible and to be contained within the pits. As such, the site is not expected to have any significant impacts to downstream areas.

The implementation of the Project, as described in the Drainage Report, is not expected to cause any adverse flooding effects on the surrounding properties. In accordance with the San Bernardino County Hydrology Manual, the Project provides sufficient flood control protection for the 100-year, 24-hour return frequency event.

Additionally, as identified below, implementation of the Project is in conformance with SMARA performance standards, which require surface mining and reclamation activities to be conducted in such a way to protect both on-site and downstream beneficial uses of water.

3.10.4 Analysis of New or More Severe Project Impacts

As discussed above, the Project would not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Hydrology and Water Quality.

The Project will amend Vulcan's entitlements to permit mineral resource extraction in additional areas (portions of Areas K and N) that were not analyzed for that use in the 1993 EIR or 2020 EIR, which has the potential to impact water supply and quality. The Project will also increase the maximum mining depth from 120-feet bgs to 240-feet bgs, which has the potential to impact groundwater quality. The potential impacts associated with increased mining depth and the updated land uses on Areas K and N are evaluated below.

The 2023 WSA evaluated how water use would compare to the projects that were previously analyzed. Water for the Project would continue to be supplied by the Area M supply well that was analyzed in the 2020 EIR. The WSA determined that water supply for the mining activities associated with the Project would remain identical to the water use that was analyzed for the Area Q Quarry (19.5 acre-feet per year). The Area M supply well extracts water from a groundwater source that is referred to as the San Bernardino Basin Area (SBBA) and is within the boundaries of the San Bernardino Valley Municipal Water District (SBVMWD). SBVMWD and the Western Municipal Water District manage the SBBA pursuant to a groundwater adjudication referred to as the "Western Judgment." SBVMWD prepared the Upper Santa Ana River Watershed Integrated Regional Urban Water Management Plan (IRUWMP) that states that there are sufficient water supplies available in the SBBA to meet anticipated water demand between 2025 and 2045, including single dry and multiple dry years. As a result, the 19.5 acre-feet per year of water use (not new use, but rather a continuation of existing water use) associated with the Project would not result in new or increased water supply impacts than were evaluated in the 2020 EIR.

The Hydrogeologic Report prepared by Sespe Consulting, dated September 2021, determined whether the 240-foot pit depth proposed by the Project could be achieved without encountering groundwater (see Appendix G). This document summarizes collected data and observed site conditions associated with groundwater on the Project site. A conceptual hydrogeologic model was prepared to delineate groundwater conditions in relation to known hydraulic barriers located beneath the Project site. Based on this hydrogeologic model, which was tested and refined based on site-specific groundwater data the Hydrogeologic Report determined that groundwater is present at a depth lower than 260 feet bgs throughout the Project site. As a result, the report concluded that the Project's excavation of quarry pits to a total depth of 240 feet bgs at Cajon

Creek Quarry Areas K, L, M, and the Area Q Quarry, and to a total depth of 120 feet bgs at Area N, would not expose groundwater or result in any new impacts to the groundwater source underlying the Project site. Based on this study, it was determined that increased mining depths would not have any substantial impacts on groundwater.

3.10.5 CEQA Appendix G Environmental Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant impact related to hydrology and water quality if the Project would:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

The use of hazardous materials during mining operations would mainly include the continued use of petroleum fuels, lubricants, and fluids associated with vehicles and equipment used in mining operations. A variety of management practices and Project design features would be implemented to minimize the possibility of significant releases of these substances.

Motor fuel (diesel) and hazardous materials used for maintenance would continue to not be stored at the Project site. Mining vehicles and equipment would continue to be fueled with off-site mobile fuel trucks in accordance with the existing site BMPs identified in the SWPPP, and Hazardous Materials Business Plan (HMBP). Waste products would continue to be disposed of offsite in accordance with local, State, and Federal regulations. Vulcan's fueling procedures, and inspection and maintenance programs, would continue to be implemented to verify that vehicles and equipment are operating properly, and leaks are prevented. Mining would not reach the groundwater level.

The management of hazardous materials as well as the mining and maintenance practices and BMPs would be the same, or improved upon, compared to those evaluated in the 1993 and 2020 EIRs. Therefore, the Project would continue to have a less than significant impact on water quality. The Project would not result in a new significant environmental effect or increase in the severity of a previously identified environmental effect to the CEQA Appendix G, Criterion "a".

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Based on the previous 2020 WSA and the 2023 WSA, there is adequate water available to supply the Project throughout its life, without interfering with existing or future groundwater uses. The Project calls for the continued use of water for dust control, onsite processing and landscaping purposes as is currently occurring or approved for the Cajon Creek Quarry and the Area Q Quarry. The Project water supplies are sufficient to serve the demand, which would not change or increase, generated over the full life of the Project under average normal year, single dry year, and multiple dry year conditions.

In summary, as evaluated in the two WSA reports, the Project would not generate new water demand, nor would it substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. The mining practices, operations and BMPs for this Project would either be the same or improved upon as those evaluated in the 1993 and 2020 EIRs. Therefore, the Project would not result in a new significant environmental effector increase in the severity of a previously identified environmental effect to the CEQA Appendix G, Criterion "b".

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i. result in substantial erosion or siltation on- or offsite;

ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or,

iv. impede or redirect flood flows?

No natural surface water courses traverse the Project site. Continuing excavation of mine pits is not expected to affect flows in surface waters in the Cajon Wash. Additionally, the Project would not create impervious surfaces.

The Project has coverage under the General Permit for Discharges of Storm Water Associated with Industrial Activities (Permit Order 2014-0057-DWQ). All of the Project site operational areas would continue to be covered by this general permit (IGP). As required by the IGP, the existing site-specific SWPPP would continue to be implemented. The SWPPP contains BMPs associated with potential discharge areas, hazardous materials, and sediment and erosion control measures. Monitoring and inspections required by the permit would continue to be conducted to determine if changes to the erosion and sediment controls are warranted. The existing SWPPP is a living document, and will be updated as needed throughout the life of the Project.

As part of the 2019 Drainage Study for the 2020 EIR, as well at the 2023 Drainage Study prepared for this Project, the potential for encroachment into surrounding water bodies, specifically Cajon Creek, the Devil Creek Diversion Channel and the existing floodplain as evaluated. Based on these evaluations, no encroachment is anticipated and therefore significant impacts due to erosion or siltation are not expected during mining or reclamation at the Project site. Rather, site drainage would be captured within the mining area thereby precluding erosion and sediment transport offsite. And, upon completion of mining surface flows would be contained in the final reclaimed mine pits, and would therefore not have any significant impacts to downstream areas (Sespe Consulting Inc., 2019, 2023).

The Sespe Drainage Reports (Sespe Consulting, Inc., 2019, 2023) identify specific erosion control measures, as prescribed in the California Stormwater Quality Association (CASQA) Best Management Handbook's, to be installed and maintained as needed to eliminate discharge of sediment from the site. When implemented, these erosion control methods would continue to

control runoff from not less than the 20-year, 1-hour storm, and would conform to the SMARA performance standards for drainage and erosion control in § 3706 of the regulations.

Based on the Sespe Drainage Reports (June 2019, 2023) and considering the information presented in the Chang Consultants December 2018 letter report, as was the case in 2020, implementation of the Project is expected to reduce flooding potential, as the pits would serve to capture surface flow, rather than exacerbate it. Therefore, the runoff surface area would be reduced by the Project. Additionally, since the Project would not encroach into the floodplain or affect the Devil Creek Diversion Channel, it would not change flood flows or otherwise restrict flooding.

The mining practices, operations and BMPs for this Project would either be the same or improved upon as those evaluated in the 1993 and 2020 EIRs. Based on the results of the Drainage reports discussed above, the Project would not result in a new significant environmental effector increase in the severity of a previously identified environmental effect to the CEQA Appendix G, Criterion "c".

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

The site is not expected to receive significant local runoff from the surrounding properties due to the existing topography and surrounding land uses. As described in the Drainage Reports (2019, 2023), Muscoy Groin #3 has been designed to direct flows from Cajon Creek away from the Project site. Moreover, according to Drainage Reports prepared by Sespe (2019, 2023), the Project would not encroach into surrounding water bodies. Local drainage within the mining operation would be collected in the excavated pits and would not be released to the Devil Creek Diversion Channel.

A HydroCAD® model for the existing site conditions was prepared as part of the Sespe (2019, 2023) drainage studies to estimate the maximum runoff flow from the site. Based on this modeling, the Project area would result in lowered pits that would retain on-site rainfall at the completion of mining and post-reclamation for the modeled storm events.

The implementation of the Project is not expected to cause any adverse flooding effects on the surrounding properties. In accordance with the San Bernardino County Hydrology Manual, the Project provides sufficient flood control protection for the 100-year return frequency event.

The Project is not located in areas such as the ocean or semi- or fully-enclosed body of water that could be impacted by a tsunami, nor is it in or near seiche zones.

The location of the Project as well as the mining practices, operations and BMPs that would be implemented for this Project would either be the same or improved upon as those evaluated in the 1993 and 2020 EIRs. Based on the results of the Drainage reports discussed above, the Project would not result in a new significant environmental effector increase in the severity of a previously identified environmental effect to the CEQA Appendix G, Criterion "d".

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

As discussed above and in the WSA prepared for the Project, the Project would not place an additional demand on surface or groundwater resources, nor would it involve a discharge that could potentially impact water quality. The Project SWPPP would require the implementation of the same or updated BMPs as the SWPPP evaluated in the 2020 EIR. Taken together, these Project features would not create or otherwise result in an impediment to implanting regional water quality control plans (Basin Plans) or sustainable groundwater management plans.

The mining practices, operations and BMPs that would be implemented for this Project would either be the same or improved upon as those evaluated in the 1993 and 2020 EIRs. Based on the results of the WSAs and Drainage reports discussed above, the Project would not result in a new significant environmental effector increase in the severity of a previously identified environmental effect to the CEQA Appendix G, Criterion "e".

3.10.6 Addendum Conclusions

The Hydrology and Water Quality Section set forth in the 1993 EIR and 2020 EIR and the conclusions adopted with certification of the 1993 EIR and 2020 EIR remain accurate and are unchanged by this Addendum. The Project will not have any new significant hydrology, drainage or water quality impacts not previously assessed in the 1993 EIR or 2020 EIR. All previously identified conditions and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	Less than Significant with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would: i) result in a substantial erosion or siltation on- or off-site; ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or, iv) impede or redirect flood flows?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	Less than Significant Impact with Mitigation Incorporated	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.11 LAND USE AND PLANNING

3.11.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.11.5, was used to identify whether the proposed Project (i.e., the consolidation of the Cajon Creek and Area Q Quarries) would result in new significant impacts or an increase in the severity of a previously identified environmental effect on land use and planning when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the analysis of the proposed changes and findings.

3.11.2 1993 EIR Conclusions

The 1993 EIR included an evaluation of land use-related impacts associated with the Specific Plan and determined that it would result in significant and unavoidable impacts associated with conversion of state-designated regionally significant mineral resource land to other uses. With the exception of conversion of state-designated regionally significant mineral resource land to other uses, changes or alterations have been required in, or incorporated into, the project which avoids or substantially lessen the potential significant land use impacts identified in the EIR. (Draft 1993 EIR, pgs. 4-64 – 4-72; Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 16-17.)

The Specific Plan involved changing the zoning on lands designated for mineral resource extraction in the City's General Plan and as state-designated regionally significant mineral resource land to industrial and open space uses. This impact was found to be significant and unavoidable because it would result in the incomplete recovery of regionally significant mineral resources.

The 1993 EIR evaluated potential impacts to adjacent land uses, including scattered residences on Cajon Boulevard and found that the Specific Plan was designed to reduce incompatibilities between designed areas for mineral resource extraction, industrial, and other land uses. For example, the 1993 EIR found that:

> Light industrial development within Planning Areas E and K, has been incorporated into the Specific Plan, adjacent to Planning Areas F and L, proposed for mining. This development will provide buffering from residences on Cajon Boulevard and other land uses to the east. Should the commencement of extractive operations precede the development of these buffers, the Specific Plan also provides that eastern berms and/or landscape screen vegetation shall be used to accomplish the same objectives.
>
> (Draft 1993 EIR, pg. 4-71.)

With respect to the processing plant on Planning Area N, the 1993 EIR found that its distance from nearby residences and the intervening railroad between Area N and nearby residences provide buffering to ensure compatibility.

3.11.3 2020 EIR Conclusions

The 2020 EIR included an evaluation of land use-related impacts associated with the Area Q Quarry and determined that it would not result in any potentially significant impacts and that no mitigation was required. (Draft 2020 EIR, pgs. 3.9-1 – 3.9-32; Final 2020 EIR, pg. 1-7.)

The 2020 EIR evaluated whether the Area Q Quarry would physically divide an established community or conflict with any land use plan, policy, or regulation.

With respect to whether the project would divide an established community, the 2020 EIR determined that the project area is surrounded by railroad tracks on the west, the Devil Creek Diversion Channel and an existing eight-foot-high berm to the south (separating the project from the community of Muscoy), the Cajon Creek Quarry to the north, and Cajon Boulevard to the east. As a result, the project would not divide the nearby community of Muscoy.

With respect to any conflicts with a land use plan, policy, or regulation, the 2020 EIR found that the project would require a rezone from residential zoning to the Community Industrial designation that permits surface mining operations upon approval of a Conditional Use Permit. Following approval of the requested zoning and general plan amendments, the project would be consistent with the underlying land use designation for the project site. The zoning change would be consistent with the County's goal to conserve areas containing significant mineral deposits while promoting the reasonable, safe, and orderly operation of mining activities. As a result, the project would not conflict with the County's approved zoning and general plan designation following approval of the requested amendments.

Based on the findings above, the 2020 EIR determined that the Area Q Quarry would not have significant land use-related impacts.

3.11.4 Analysis of New or More Severe Project Impacts

The changes associated with the Project would not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Land Use. As previously discussed in Section 1.0, the Project proposes the following amendments to existing operations and entitlements:

- Mineral resource extraction in Planning Area K to a depth of 240 feet bgs and in Planning Area N to a depth of 120 feet bgs that was not analyzed in the 1993 EIR and 2020 EIR.
- Increase the mining depth in Areas L, M and Q from 120 feet bgs to 240 feet bgs.
- Mining the resources located between Areas K, L, and Q in one mining area, and Areas M and N in another, creating two mining pits consolidated into one quarry for efficient mineral resources recovery.

No other changes to the operation are proposed. The pace, nature, equipment used, and traffic generation/routes will not change. Other than revising the Specific Plan land use designation for Area K from light industrial to material extractive, and modifying the Specific Plan development

standards for Areas K, L, M, and N, no other City or County land use designations would be changed as a result of the Project.

3.11.5 CEQA Appendix G Environmental Significance Criteria

In order to determine if the Project would result in significant impacts to land use and planning, the CEQA Appendix G Environmental Significance Criteria was utilized. This Criteria notes that a project would have a potentially significant land use impacts if the Project would:

a) Physically divide an established community?

b) Cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

As stated above, the only Project land use change would be to the Specific Plan, which will be amended to permit mineral resource extraction in Planning Areas K and N, which was not analyzed in the 1993 EIR and 2020 EIR.

Area N has a General Plan land use designation of "Industrial Extractive" (I/E). The Specific Plan identifies Area N for use as the aggregate processing plant site. In 2007, Vulcan obtained Minor Modification 07-08, which permitted Vulcan to relocate mineral processing on Area N to Area M, meaning that a plant site can be constructed in either Area M or Area N under Vulcan's present entitlements. The City determined that this change was consistent with the Specific Plan. Like the Minor Modification 07-08 approved in 2007, authorizing mineral resource extraction in addition to mineral processing on Area N would be consistent with the I/E General Plan designation and the Specific Plan, and would not result in new impacts to adjacent land uses. Instead, once portions of Area N have been mined to 120-feet below ground surface, the quarry walls would serve as further noise and visual attenuation that will further reduce potential conflicts with adjacent land uses. Therefore, the material extraction proposed at Area N under the Project would not result in any new or more severe potential land use impacts compared to the project that was evaluated in the 1993 EIR.

Area K has a current General Plan land use designation of "Industrial Light" (I/L). The Specific Plan and identifies Area K for use as "Light Industrial/Buffer Development." No light industrial land uses have been developed on Area K. Vulcan has, however, constructed a vegetated berm along the eastern boundary to buffer adjacent land uses east of Cajon Boulevard from mining activities. Changing the General Plan and Specific Plan land use designation for Area K from I/L to I/E would not conflict with the Specific Plan or result in new impacts to adjacent land uses and would reduce impacts associated with conversion of lands designated as regionally significant mineral resource land to other uses. Following approval of the General Plan and Specific Plan amendments envisioned by the Project, mineral extraction on Area K would not conflict with any approved plans or polices.

With respect to adjacent land uses, the Specific Plan envisioned that an earthen berm would be constructed in Area K to limit impacts to adjacent land uses if resource extraction of Area L began before light industrial uses were established in Area K. The Project would amend the Specific Plan

so that no light industrial uses would be established in Area L and the earthen berm would remain while resource extraction activities occur to the west. This change is consistent with the assumptions in the 1993 EIR, which found that either the earthen berm or light industrial development would be sufficient to buffer land uses east of Cajon Boulevard from resource extraction activities.

Lastly, the Project would continue to comply with applicable conditions and requirements of the City Development Code that require approval of a CUP, Reclamation Plan, and financial assurances for reclamation before commencement of the operation. Through compliance with the applicable City Development Code standards, approval of the Amended Reclamation Plan and financial assurance, and continued adherence to applicable SMARA compliance requirements (i.e., annual mine inspection and annual report), the Project would be consistent with the applicable City Development Code standards for resource extraction activities.

Because the Project is consistent with City plans and Development Code requirements related to resource extraction, and because it includes project features that minimize adverse impacts to surrounding properties, the Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to land use.

3.11.6 Addendum Conclusions

The Land Use Section set forth in the 1993 EIR and 2020 EIR and the conclusions adopted with certification of the 1993 EIR and 2020 EIR remain accurate and are unchanged by this Addendum. The Project will not have any new land use impacts not previously assessed in the 1993 EIR or 2020 EIR. All previously identified conditions and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Physically divide an established community?	No Impact	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	Less than Significant Impact with Mitigation Incorporated	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.12 MINERAL RESOURCES

A detailed discussion of mineral resources has been scoped out from this Addendum. The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on mineral resources if the project would:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

b) Result in the loss of availability of a locally-important mineral resources recovery site delineated on a local general plan, specific plan or other land use plan?

The Project would not result in the loss of availability of a locally important mineral resource site delineated on a local general plan, specific plan, or other land use plan. Conversely, the Project would ensure that Vulcan could continue to develop a locally-important source of aggregate resources to continue to serve the San Bernardino region. For these reasons, the Project would not create any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Mineral Resources when compared to those previously evaluated and disclosed within the 1993 EIR and the 2020 EIR.

3.13 NOISE

3.13.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.13.5, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect related to noise when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the addendum analysis and findings.

3.13.2 1993 EIR Conclusions

The 1993 EIR included an evaluation of noise-related impacts associated with the Specific Plan. The 1993 EIR relied on findings from an acoustical analysis conducted by Giroux & Associates in May 1991. Potential impacts identified included noise impacts generated by mineral resources processing in Planning Areas D, I, and N. With respect to extractive areas, the 1993 EIR found that noise within extractive areas would generally be shielded by the walls of the quarry itself, and perimeter berms and stockpiles (where feasible). Additionally, no blasting would occur. For these reasons, the 1993 EIR found there would not be any significant impacts to sensitive receptors. Lastly, no significant impacts were anticipated from mobile sources because the background masking noise from Interstate 215 and Cajon Boulevard, together with the minimum setbacks provided in the Specific Plan, eliminate the possibility of significant impacts. (Draft 1993 EIR, pgs. 4-53 – 4-63; Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 14-15.)

As noted in the 1993 EIR, at that time the areas of most concern for off-site impacts associated with processing facilities in Areas D, I, and N were residential areas located south and east of the Specific Plan area. Because of the potential that processing operations could exceed the maximum community noise equivalent level (CNEL) for residential land uses, the 1993 EIR included a mitigation measure limiting noise levels. Additionally, Conditional Use Permit 91-31 include the Conditions of Approval to achieve noise reduction related to the processing facilities in Planning Area N.

Specifically, the following mitigation measures were included as part of the 1993 EIR:

- Plant operations, including aggregate extraction, processing, handling and formulation of any construction materials, shall not cause hourly noise levels to exceed any of the following noise levels at the nearest occupied residence to the processing plant:
    - 65 dB L_{eq} from 7:00 a.m. to 7:00 p.m.;
    - 60 dB L_{eq} from 7:00 p.m. to 10:00 p.m.; and
    - not to exceed 55 dB L_{eq} from 10:00 p.m. to 7:00 a.m.

- Plant site layout and design shall be located in such a manner as to minimize impacts to residences to the southwest of Planning Area N, behind the Southern Pacific Railroad embankment.

  (Draft 1993 EIR, pgs. 4-62 – 4-63.)

In addition to the 1993 EIR mitigations summarized above, the following noise reduction measures were included as Conditions of Approval for Conditional Use Permit 91-31:

- **Condition of Approval No. 27:** Extraction activities and aggregate processing may occur anytime between 6:00 a.m. and 10:00 p.m., Monday through Saturday; however, extraction activities shall not exceed a total of 12 hours per day. An allowable exception to these hours would be operations in response to an emergency to protect life or property, or in response to the requirements of government or government agencies beyond the control of the operator.

  Maintenance activities may be conducted at any time.

- **Condition of Approval No. 28:** No mining or processing operations shall be conducted on Sundays or holidays, although maintenance activities may occur at any time (see previous Condition).

- **Condition of Approval No. 29:** At no time shall there be any blasting, dynamiting or use of explosives of any kind whatsoever on the premises.

In analyzing the future impact of noise levels from Area N on nearby land uses, the 1993 EIR determined that the railroad embankment that separates Planning Area N, coupled with the noise attenuation measures above, would sufficiently mitigate adverse noise-related impacts to nearby sensitive land uses.

3.13.3 2020 EIR Conclusions

The 2020 EIR included an evaluation of noise and vibration related impacts associated with the Area Q Quarry. (Draft 2020 EIR, pgs. 3.10-1 – 3.10-37; Final 2020 EIR, pg. 1-7.) The 2020 EIR relied on findings from a Noise Impact Assessment conducted by Sespe Consulting, Inc. in 2020. The following project design features designed to limit noise impacts were evaluated as part of the project in the 2020 EIR:

- Prior to any mining activities and/or significant materials excavation, an approximately 10-foot high vegetated earthen berm would be built along the entire length of the Project site's *(i.e., Area Q's*) southern boundary with sufficient length to break line-of-sight between adjacent residential receptors located in Muscoy and proposed mining areas.

- The approximately 10-foot high berm would serve as the primary storage location for topsoil and subsoil removed from the Area Q Quarry site. Please see Figure 2-4 in Section 2.0 – Project Description (within the 2020 EIR) which shows the location of the proposed perimeter berm.

- There would be no off-site on-road haul truck trip leaving or entering the Project site from public roads.

- No excavation of material or overburden would take place within twenty-five (25) to fifty (50) feet from the public right-of-way or other property lines.

- Blasting would not be used for the proposed mining operations.

  (Draft 2020 EIR, pg. 3.10-27.)

The 2020 EIR evaluated potentially significant impacts associated with an increase in ambient noise and vibration associated with construction (removal of topsoil and construction of the southern berm) and operations (mining and extraction of aggregate) proposed within the Area Q Quarry. The 2020 EIR found that there were no potentially significant impacts associated with vibration or proximity to airport land uses.

With respect to potentially significant increases in ambient noise, the 10-foot-high berm was determined to adequately shield nearby sensitive land uses from any increase in ambient noise associated with the mining activity to be carried out under the project. However, the analysis found that before the berm is constructed, there would not be any physical barrier to attenuate noise impacts associated with topsoil/subsoil removal and berm construction, which was anticipated to last for a period of three months. As a result of these potential temporary impacts, the 2020 EIR included the following mitigation measure designed to limit impacts to nearby sensitive land uses associated with berm construction and topsoil removal:

- **Mitigation Measure NO-1:** Topsoil/subsoil removal and berm construction activities shall only occur between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday as defined by Section 83.01.080(g)(3)-Exempt Noise of the San Bernardino County Code of Ordinances.

  (Draft 2020 EIR, pg. 3.10-33.)

Upon application of the mitigation measure above, the 2020 EIR determined that the Area Q Quarry would not have any significant noise-related impacts.

3.13.4 Analysis of New or More Severe Project Impacts

The Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Noise and Vibration.

As discussed in Section 1.0, the Project seeks to make certain changes to operational characteristics under the Cajon Creek and Area Q entitlements. Specifically, Vulcan proposes the following amendments to existing operations and entitlements:

- Mineral resource extraction in Planning Area K to a depth of 240 feet bgs and in Planning Area N to a depth of 120 feet bgs that was not analyzed in the 1993 EIR and 2020 EIR.

- Increasing the final mining depth in Areas L, M and Q from 120 feet bgs to 240 feet bgs.
- Mining the resources located between Areas K, L, and Q in one mining area, and Areas M and N in another, creating two mining pits consolidated into one quarry for efficient mineral resources recovery.

- Processing operations would also be relocated from Area M to Area N, but only at such time that Area N had been mined to a maximum depth of 120-feet bgs (i.e., the processing plant would operate at the bottom of the pit).

No other changes to the operation are proposed. The pace, nature, equipment used, and traffic generation/routes will not change.

Additionally, the Project site currently has existing perimeter berms to control offsite noise. Specifically, 10- to 12-foot-high earthen and vegetated perimeter berms have been installed along the entirety of the site's southern boundary of Area Q (adjacent to Devil Creek Diversion Channel and the community of Muscoy) and along the entire eastern boundary of Areas K and Q (adjacent to Cajon Boulevard). These existing perimeter berms, which provide significant noise attenuation at receptors located to the east and south of the Project, would remain and be maintained throughout the life of the proposed Project. Additionally, mining operations under the existing entitlements have brought Areas M and L below original grade. The existing perimeter berms and existing excavation pit walls, both of which block and attenuate, would remain throughout the life of the Project.

Sespe Consulting has prepared a Noise Analysis to evaluate whether the operational changes summarized above would create new or more severe noise or vibration impacts. As part of the analysis, noise measurements were also taken at various locations surrounding the existing Project site in October 2022, and existing operational noise levels were below applicable City and County noise standards. As discussed in the Noise and Vibration Analysis, none of the Project components would generate new or increased noise impacts at nearby receptors. Conversely, because the Project would increase the mining depth, and therefore excavation and processing equipment would operate at lower elevations than they currently do today (and lower elevations than were considered in the previous EIRs), noise and vibration levels associated with the Project would be less than what was discussed in the 1993 EIR and 2020 EIR. Similarly, no aspects of the Project have the potential to create new or more severe vibration impacts. See the attached Noise Analysis (Appendix H) prepared by Sespe for additional detail.

Additionally, since certification of the 1993 EIR and 2020 EIR, development in the vicinity of the Project site has not created the potential for an increase in noise impacts from previously analyzed operations. The distance to the nearest sensitive residential uses has not changed. The closest homes in 1993 and 2020 (the homes located in the nearby community of Muscoy) continue to be the closest homes to the site today, and no new residential neighborhoods have been developed in the area.

Lastly, since 1993 and 2020, there have been no changes to the standards of significance provided in CEQA Appendix G Environmental Checklist regarding analysis of noise. Based on review of the Project, and summarized within the Noise and Vibration Analysis, no new or greater significant noise or vibration impacts would result when compared to those addressed in the 1993 EIR and 2020 EIR.

3.13.5 CEQA Appendix G Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant impacts related to noise if the Project would:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

See discussion above, as well as Sespe's Noise Analysis included in Appendix H. The Project would not change the pace or method of onsite mining or processing. Additionally, the existing perimeter berms that shield onsite noise from nearby receptors would remain. Lastly, as excavation would occur at deeper depths compared to what was analyzed previously, potential noise impacts are expected to be less under the proposed Project compared to what was disclosed in the 1993 and 2020 EIRs. For these reasons, the Project would not generate an increase in ambient noise levels beyond what was previously determined in the 1993 and 2020 EIRs.

b) Generation of excessive groundborne vibration or groundborne noise levels?

See discussion above. The Project would continue to use existing onsite mining and processing equipment. No blasting would be required. As such, Project vibration levels would remain below the threshold of perception beyond the Project site boundary, and there would be no new or more severe vibration impacts.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The proposed Project site is not located within 2.0 miles of any private or public airports or airstrips, or in an area governed by an airport land use plan. As was the case in 2020, the closest public airport/airstrip remains the Ontario International Airport, located approximately 13 miles southwest of the Project site. Furthermore, the Project does not involve the creation of new noise-sensitive land uses (i.e., residences). Therefore, the Project would have less than significant impact related to airport/airstrip noise levels.

3.13.6 Addendum Conclusions

The Noise sections in the 1993 EIR and 2020 EIR and the conclusions adopted with certification of the 1993 EIR and 2020 EIR remain accurate and are unchanged by this Addendum. The Project will not have any new significant noise and vibration impacts not previously assessed in the 1993 EIR and 2020 EIR. All previously identified conditions and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Less than significant with Mitigation Incorporated	Less than significant with Mitigation Incorporated	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
b) Generation of excessive groundborne vibration or groundborne noise levels?	Less than Significant	Less than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	No Impact	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.14 POPULATION AND HOUSING

A detailed discussion of population and housing has been scoped out from this Addendum. The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on population and housing if the Project would:

a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing a new homes and businesses) or indirectly (for example through extension of roads or other infrastructure)?

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

The amended Project would not induce unplanned population growth in the area, nor would it displace substantial numbers of existing people or housing. As previously discussed, other mining in Areas K and N, the Project would not significantly change the elements of the existing entitlements or onsite operations at the Cajon Creek and Area Q quarries. The Project would not involve the construction of new residences, nor would it require an additional number of personnel or contractors working on- or off-site. Further, the Project does not propose to extend beyond the existing permit boundaries. Therefore, the Project would not result in displacement of people or housing, nor would it induce unplanned population growth within the surrounding areas. For these reasons, the Project would not create any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to population or housing when compared to those previously evaluated and disclosed within the 1993 EIR and the 2020 EIR.

3.15 PUBLIC SERVICES

A detailed discussion of public services has been scoped out from this Addendum. The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on public services if the Project would:

a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

- *i. Fire Protection?*
- *ii. Police Protection?*
- *iii. Schools?*
- *iv. Parks?*
- *v. Other public facilities?*

The Project would not result in substantial adverse impacts to public services. The number of employees needed for the Project operations would not change from the existing levels, and the nature of mining and processing operations would continue to be the same as currently occurs onsite. Therefore, there would be no impact on public services such as schools, parks, police protection and fire protection, and the Project would not create any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Public Services when compared to those previously evaluated and disclosed within the 1993 EIR and the 2020 EIR.

3.16 RECREATION

A detailed discussion of recreational resources has been scoped out from this Addendum. The CEQA Appendix G Environmental Checklist contains the following criteria noting that a project would have a potentially significant impact on recreation if the Project would:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or to be accelerated?

b) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

As discussed above, the Project does not include new housing and the number of on- and off-site employees would not increase above existing levels. Therefore, the Project would not otherwise directly or indirectly induce population growth within the Project vicinity or increase the use of recreational facilities such that substantial deterioration of the facility would occur or be accelerated. The Project would also not require the construction of new or expansion of existing recreational facilities. For these reasons, the Project would not create any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Recreation when compared to those previously evaluated and disclosed within the 1993 EIR and the 2020 EIR.

3.17 TRANSPORTATION

3.17.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.17.5, was used to identify whether the proposed Project would result in new significant impacts or an increase in the severity of a previously identified environmental effect related to transportation when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the analysis of the proposed changes and findings.

3.17.2 1993 EIR Conclusions

The 1993 EIR included an evaluation of traffic-related impacts associated with the Specific Plan and found that, due to project design features and mitigation measures, the Specific Plan will not result in significant unavoidable impacts on traffic and circulation. (Draft 1993 EIR, pgs. 4-73 – 4-89; Resolution Certifying Final 1993 EIR, Attachment 1, pgs. 17-19.)

Within the 1993 EIR, the specific amount of vehicle trips that were anticipated for each planning area varied based on the land use assumption. Area K would be developed in the near-term phase and was anticipated to produce 2,160 trips per day. During the near-term phase (prior to mining) and the long-term phase (following reclamation), Areas L and M were anticipated to be used as a Construction Materials Park that would generate 653 and 488 trips per day, respectively. During the intermediate-term phase, Areas L and M were anticipated to produce zero (0) trips per day and Area N was anticipated to produce 950 trips per day (800 truck and 150 employee vehicles).

The 1993 EIR identified potential traffic-related impacts due to an increase in Average Daily Trips (ADT) from Planning Areas D, E, G, H, and K in the near-term and from Planning Areas I, J, and N in the intermediate term. The 1993 EIR also identified potential impacts associated with an increase in truck traffic on Cajon Boulevard.

As discussed in the 1993 EIR. the increase in ADT associated with Planning Areas D, E, G, H, and K in the near term would be mitigated to a level of non-significance by frontage road improvements along Cajon Boulevard and Institution Road, intersection improvements at Cajon Boulevard, Institution Road, and Palm Avenue, and aggregate truck routing restrictions. The increase in ADT from Planning Areas I, J, and N in the intermediate term would be mitigated to a level of non-significance by frontage road improvements and access road improvements along Institution Road and by the roadway improvements implemented during the near term developments. Lastly, the increase in truck traffic on Cajon Boulevard would be mitigated to a level of non-significance by limiting use of Cajon Boulevard south of the Cable Creek Channel and use of the Devore Road bridge over I-215 to local deliveries.

The following mitigation measures were adopted as part of the 1993 EIR related to near-term phase development of Areas D, E, G, H, and K:

- Frontage road improvements shall be provided along Cajon Boulevard on the project side of the centerline adjacent to each Planning Area as a condition of the Tentative Map approval process for Planning Areas D, E and F; G and H; K and L; and, A and B.

- Individual lot driveway access, to Planning Areas A, B, D (ultimate use), E, G, H and K along Cajon Boulevard shall share points of access.

- Frontage road improvements shall be provided along Institution Road in accordance with the Infrastructure Improvement Plan (see Figure 4.7-2 in the 1993 EIR) as a condition of the Tentative Map approval process for Planning Areas G and H; and I and J.

- Internal street access to Planning Areas I and J shall be limited to two points along Institution Road frontage. Adequate access shall be provided for both on-site uses, as well as the provision of an on-site access road for aggregate transport trucks connecting Planning Areas M and N to the south.

- Interim improvements of the Cajon Boulevard, Institution Road and Palm Avenue intersection shall include realignment of the Institution Road leg of the intersection.

- The ultimate intersection improvement at Cajon Boulevard, Institution Road and Palm Avenue (shown in "Detail A" of Figure 4.7-2 in the 1993 EIR) shall be provided as a condition of the Tentative Map approval process for Planning Areas G and H.

The following 1993 EIR mitigation measures were also adopted related to intermediate-term phase development of Areas I, J, and N:

- Frontage road improvements shall be provided along Institution Road in accordance with the Infrastructure Improvement Plan (Figure 4.7-2) as a condition of the Tentative Map approval process for Planning Areas I and J.

- Access road improvements, including a provision for a west bound turn lane, shall be made at Institution Road should Planning Areas I and J, or N precede development of Planning Areas G and H.

Lastly, the following mitigation measures were adopted related to a decrease in Level of Service (LOS) on Cajon Boulevard:

- Palm Avenue shall be restriped between Cajon Boulevard and the 1-215 freeway, if warranted in accordance with requirements of the City Engineer, in order to accommodate four lanes of traffic.

- The use of Cajon Boulevard shall be limited to use for local deliveries south of Cable Creek Channel by aggregate truck traffic.

  (Final 1993 EIR, pgs. ES-30 – ES-33.)

3.17.3 2020 EIR Conclusions

The 2020 EIR found that the Area Q Quarry would not have any potentially significant impacts on traffic because it would not result in an increase to off-site truck or vehicle traffic. Because there would be no changes to baseline operations, the Area Q Quarry would not have traffic-related impacts. (Final 2020 EIR, pg. 1-7.)

3.17.4 Analysis of New or More Severe Project Impacts

The Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Transportation.

The Project does not propose any change to mining methods, processing operations, annual production, or phasing. The number of onsite employees would also not change or increase. Because annual throughput and processing locations will not change, the Project will not increase mining-related traffic associated with the Cajon Creek Quarry (950 trips per day) or the Area Q Quarry (0 trips per day). The Project proposes continuation of existing resource recovery on Area K. The previously approved light industrial development on Area K will be replaced with this use. An anticipated 2,160 vehicle trips per day were analyzed in the Specific Plan approvals. These trips will remain unused, and banked, as within the scope of prior environmental reviews.

Since 1993 and 2020, the CEQA Appendix G Environmental Checklist has been amended to reflect a change from a "Level of Service (LOS)" approach to evaluating potential traffic-related impacts to a "Vehicle Miles Travelled" approach. This change in approach fundamentally reshapes how traffic-related impacts are evaluated under CEQA. Despite this change to the CEQA Appendix G Environmental Checklist, no new or greater significant traffic impacts would result when compared to traffic impacts addressed in the 1993 EIR and 2020 EIR because there will be no increase in traffic generation associated with the Project. Additionally, as noted previously, the Project would ensure production of aggregate products to serve the local market would continue, which in turn would ensure that aggregate products would not need to be imported from farther locations and therefore would reduce total VMTs regionally.

3.17.5 CEQA Appendix G Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant impacts related to transportation if the Project would:

a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

As discussed above, the Project would not create additional vehicle or truck trips on local roadways that could potentially conflict with a program, plan, ordinance or policy addressing the circulation system. Rather, the Project would result in fewer vehicle trips compared to what was analyzed in the 1993 EIR, due to the conversion of Area K from light industrial development to mining. Additionally, the Project would not change the manner in which vehicles access the existing Project site onto adjacent public roadways, or require the construction of new access roads or

alterations of existing roadways, or bicycle/pedestrian facilities. Existing ingress/egress access points would continue to sufficiently serve the Project.

b) Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?

As discussed above, the Project would not change or increase the number of employee or haul truck vehicle trips per day, and therefore would not increase the daily VMTs.

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

As discussed above, there would be no change or increase in the number of daily vehicle trips, or changes to the Project site ingress/egress access points. Additionally, no offsite road improvements are proposed or required as a result of the Project. Therefore, the proposed Project would create no impact to roadway hazards due to geometric design features or incompatible uses.

d) Result in inadequate emergency access?

There would be no change or increase in the number of daily vehicle trips, or changes to the Project site ingress/egress access points. The Project would not alter existing site access nor the City roadway network which could result in inadequate emergency access. Existing emergency access points and adjacent public roadways would have sufficient capacity to continue to serve the existing number of vehicles traveling to and from the site. Project equipment and vehicles would continue to be parked off of public roads within designated onsite parking areas, and would not block emergency access routes.

3.17.6 Addendum Conclusions

The Traffic sections in the 1993 EIR and 2020 EIR and the conclusions adopted with certification of the 1993 EIR and 2020 EIR remain accurate and are unchanged by this Addendum. The Project will not have any new significant traffic impacts not previously assessed in the 1993 EIR and 2020 EIR. All previously identified conditions and mitigation measures will continue to be incorporated into the Project.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	Less Than Significant Impact with Mitigation Incorporated	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
b) Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?	Not Analyzed	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	No Impact	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
d) Result in inadequate emergency access?	No Impact	No Impact	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.18 TRIBAL CULTURAL RESOURCES

3.18.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.18.5, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect on tribal cultural resources when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the addendum analysis and findings.

3.18.2 1993 EIR Conclusions

The 1993 EIR did not include an analysis of the impact that the Specific Plan would have on tribal cultural resources. This analysis was not required in 1993 as a part of the CEQA Appendix G Guidelines or legislation in effect at that time.

3.18.3 2020 EIR Conclusions

The 2020 EIR included an evaluation of potential impacts to tribal cultural resources associated with the Area Q Quarry project. (Draft 2020 EIR, pgs. 3.11-1 – 3.11-18; Final 2020 EIR, pg. 1-7.) The 2020 EIR relied on findings from a Cultural Resources Assessment conducted by BCR Consulting, LLC in May 2020 to evaluate the potential impacts to tribal cultural resources, as defined in Public Resources Code section 21074, as a result of the site disturbance activities planned for the Area Q Quarry.

The 2020 EIR found that impacts to tribal cultural resources were potentially significant and adopted the following mitigation measures to reduce these potential impacts:

- Prior to the initiation of ground-disturbing activities, field personnel should be alerted to the possibility of buried historical or TCR deposits.

- Upon discovery of human remains, the tribal and/or archaeological monitor/consultant will immediately divert work at minimum of 150-feet and place an exclusion zone around the discovery location. The monitor/consultant(s) will then notify the onsite lead/construction manager, who will then notify the consulting Tribes, the qualified lead archaeologist, and the County coroner, pursuant to the State Health and Safety Code §7050.5, and that code will be enforced for the duration of the Project. Work will continue to be diverted while the coroner determines whether the remains are human and subsequently Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If the finds are determined to be Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a MLD.

- If the Gabrieleño Band of Mission Indians – Kizh Nation is designated MLD, the Koo-nas-gna Burial Policy shall be implemented. To the Tribe, the term “human remains” encompasses more than human bones. In ancient as well as historic times, Tribal traditions included, but were not limited to, the preparation of the soil for burial, the burial of funerary objects with the

deceased, and the ceremonial burning of human remains. The prepared soil and cremation soils are to be treated in the same manner as bone fragments that remain intact. Associated funerary objects are objects that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed with individual human remains either at the time of death or later; other items made exclusively for burial purposes or to contain human remains can also be considered as associated funerary objects.

If the San Manuel Band of Mission Indians is designated MLD in accordance with the legal process noted in Mitigation Measure CUL-2 presented in Section 3.4 – Cultural Resources, the MLD will work with the Coroner, NAHC, landowner, and Lead Agency regarding culturally appropriate practices and recommended next steps.

- Prior to the continuation of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the Project for the respectful reburial of the human remains and/or ceremonial objects. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24-hour guard should be posted outside of working hours. The MLD tribe will make every effort to recommend diverting the Project and keep the remains in situ and protected, and the landowner/applicant shall make every effort to comply with these recommendations. If the Project cannot be diverted, it may be determined that burials will be removed. The MLD Tribe will work closely with the qualified archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the MLD tribe, documentation shall be taken that includes, at a minimum, detailed descriptive notes and sketches. Additional types of documentation shall only occur once approved by the MLD tribe for data recovery purposes. Cremations will either be removed in bulk or by any means necessary to ensure complete recovery of all material. If the discovery of human remains includes four or more burials, the location is considered a cemetery and a separate treatment plan shall be created. Once complete, a final report of all activities is to be submitted to the MLD tribe and the NAHC. The tribes do not authorize any scientific study or the utilization of any invasive and/or destructive diagnostics on human remains. Each occurrence of human remains and associated funerary objects that require data recovery will be stored using opaque cloth bags. All human remains, funerary objects, sacred objects, and objects of cultural patrimony will be removed to a secure container on site if possible. These items should be retained and reburied within 6 months of recovery. The site of reburial/repatriation shall be on the Project site but at a location agreed upon between the MLD tribe and the landowner at a site to be protected in perpetuity. There shall be no publicity regarding any cultural materials recovered.

- Upon discovery of any tribal cultural or archaeological resources, construction activities shall cease within the immediate vicinity of the find (60-foot buffer) until the find can be assessed. All tribal cultural and archaeological resources unearthed by project construction activities shall be evaluated by the qualified archaeologist, by a member of the Gabrieleño Band of Mission Indians – Kizh Nation, and a member of the San Manuel Band of Mission Indians Cultural Resources Department. If the resources are Native American in origin, the Gabrieleño Band of Mission Indians – Kizh Nation and San Manuel Band of Mission Indians shall

coordinate with the landowner regarding treatment and curation of these resources. Typically, the tribe will request preservation in place or reburial onsite, though will recommend data recovery for educational purposes if other options are exhausted. Work may continue on other parts of the Project while evaluation and, if necessary, additional protective mitigation takes place (CEQA Guidelines Section15064.5(f)). If a resource is determined by the qualified archaeologist to constitute a "historical resource" or "unique archaeological resource", time allotment and funding sufficient to allow for implementation of avoidance measures, or appropriate mitigation, must be available.

- For unique archaeological resources, preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. All analysis proposals will be reviewed and approved by the consulting Tribes. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials within the County, if such an institution agrees to accept the material. If no institution accepts the archaeological material that is not Native American in origin, they shall be offered to the Gabrieleño Band of Mission Indians – Kizh Nation or a local school or historical society in the area for educational purposes.

- Native American human remains are defined in PRC 5097.98 (d)(1) as an inhumation or cremation, and in any state of decomposition or skeletal completeness. Funerary objects, called associated grave goods in PRC 5097.98, are also to be treated according to this statute. Health and Safety Code 7050.5 dictates that any discoveries of human skeletal material shall be immediately reported to the County Coroner and excavation halted until the coroner has determined the nature of the remains. If the coroner recognizes the human remains to be those of a Native American or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the NAHC and PRC 5097.98 shall be followed. More details on this process can be found in Mitigation Measure CUL-2 (see Section 3.4 – Cultural Resources).

- Archaeological and Native American monitoring and excavation during construction Projects will be consistent with current professional standards. All feasible care to avoid any unnecessary disturbance, physical modification, or separation of human remains and associated funerary objects shall be taken. Principal personnel must meet the Secretary of Interior standards for archaeology and have a minimum of 10 years of experience as a principal investigator working with Native American archaeological sites in southern California. The qualified archaeologist shall ensure that all other personnel are appropriately trained and qualified.

  (Draft 2020 EIR, pgs. 3.11-15 – 3.11-17.)

The 2020 EIR determined that the mitigation measures listed above would reduce potential impacts to tribal cultural resources associated with the Area Q Quarry to a level of non-significance.

3.18.4 Analysis of New or More Severe Project Impacts

The Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Tribal Cultural Resources.

The Project will amend the Specific Plan to permit mineral resource extraction in additional areas (Area K and a portion of Area N) that were not analyzed for impacts to tribal cultural resources in the 1993 EIR or 2020 EIR. The 2020 EIR referenced findings from a Cultural Resources Assessment which performed field surveys, evaluations of historical records, and outreach to Native American tribes (in accordance with AB 52) to determine whether any tribal cultural resources were located on or near the Area Q Quarry. The Cultural Resources Assessment determined that there were no known tribal cultural resources on or near the Area Q Quarry that would be impacted. As a result, analysis conducted for the 2020 EIR determined that there are no known tribal cultural resources located on or near the Area Q Quarry.

The portions of the Project located outside the Area Q Quarry have been subject to significant site disturbance from mining and processing activities and construction of the earthen perimeter berms, such as the topsoil/subsoil storage berm on Area K or the processing facilities on Area N. Any tribal cultural resources visible during field surveys in these areas would likely have been subject to disturbance during these mining and construction activities. However, there is still the potential that the project will impact unknown, buried tribal cultural resources while carrying out mineral resource extraction activities.

In order to avoid potential impacts to tribal cultural resources associated with mining on portions of Areas K and N, the following mitigation measures currently imposed on the existing operations will continue to apply under the Project.

- Prior to the initiation of ground-disturbing activities, field personnel should be alerted to the possibility of buried historical or TCR deposits.

- Upon discovery of human remains, the tribal and/or archaeological monitor/consultant will immediately divert work at minimum of 150-feet and place an exclusion zone around the discovery location. The monitor/consultant(s) will then notify the onsite lead/construction manager, who will then notify the consulting Tribes, the qualified lead archaeologist, and the County coroner, pursuant to the State Health and Safety Code §7050.5, and that code will be enforced for the duration of the Project. Work will continue to be diverted while the coroner determines whether the remains are human and subsequently Native American. The discovery is to be kept confidential and secure to prevent any further disturbance. If the finds are determined to be Native American, the coroner will notify the NAHC as mandated by state law who will then appoint a MLD.

- If the Gabrieleño Band of Mission Indians – Kizh Nation is designated MLD, the Koo-nas-gna Burial Policy shall be implemented. To the Tribe, the term “human remains” encompasses more than human bones. In ancient as well as historic times, Tribal traditions included, but were not limited to, the preparation of the soil for burial, the burial of funerary objects with the deceased, and the ceremonial burning of human remains. The prepared soil and cremation soils

are to be treated in the same manner as bone fragments that remain intact. Associated funerary objects are objects that, as part of the death rite or ceremony of a culture, are reasonably believed to have been placed with individual human remains either at the time of death or later; other items made exclusively for burial purposes or to contain human remains can also be considered as associated funerary objects.

If the San Manuel Band of Mission Indians is designated MLD in accordance with the legal process noted in Mitigation Measure CUL-2 presented in Section 3.4 – Cultural Resources, the MLD will work with the Coroner, NAHC, landowner, and Lead Agency regarding culturally appropriate practices and recommended next steps.

- Prior to the continuation of ground disturbing activities, the land owner shall arrange a designated site location within the footprint of the Project for the respectful reburial of the human remains and/or ceremonial objects. In the case where discovered human remains cannot be fully documented and recovered on the same day, the remains will be covered with muslin cloth and a steel plate that can be moved by heavy equipment placed over the excavation opening to protect the remains. If this type of steel plate is not available, a 24-hour guard should be posted outside of working hours. The MLD tribe will make every effort to recommend diverting the Project and keep the remains in situ and protected, and the landowner/applicant shall make every effort to comply with these recommendations. If the Project cannot be diverted, it may be determined that burials will be removed. The MLD Tribe will work closely with the qualified archaeologist to ensure that the excavation is treated carefully, ethically, and respectfully. If data recovery is approved by the MLD tribe, documentation shall be taken that includes, at a minimum, detailed descriptive notes and sketches. Additional types of documentation shall only occur once approved by the MLD tribe for data recovery purposes. Cremations will either be removed in bulk or by any means necessary to ensure complete recovery of all material. If the discovery of human remains includes four or more burials, the location is considered a cemetery and a separate treatment plan shall be created. Once complete, a final report of all activities is to be submitted to the MLD tribe and the NAHC. The tribes do not authorize any scientific study or the utilization of any invasive and/or destructive diagnostics on human remains. Each occurrence of human remains and associated funerary objects that require data recovery will be stored using opaque cloth bags. All human remains, funerary objects, sacred objects, and objects of cultural patrimony will be removed to a secure container on site if possible. These items should be retained and reburied within 6 months of recovery. The site of reburial/repatriation shall be on the Project site but at a location agreed upon between the MLD tribe and the landowner at a site to be protected in perpetuity. There shall be no publicity regarding any cultural materials recovered.

- Upon discovery of any tribal cultural or archaeological resources, construction activities shall cease within the immediate vicinity of the find (60-foot buffer) until the find can be assessed. All tribal cultural and archaeological resources unearthed by project construction activities shall be evaluated by the qualified archaeologist, by a member of the Gabrieleño Band of Mission Indians – Kizh Nation, and a member of the San Manuel Band of Mission Indians Cultural Resources Department. If the resources are Native American in origin, the Gabrieleño Band of Mission Indians – Kizh Nation and San Manuel Band of Mission Indians shall coordinate with the landowner regarding treatment and curation of these resources. Typically,

the tribe will request preservation in place or reburial onsite, though will recommend data recovery for educational purposes if other options are exhausted. Work may continue on other parts of the Project while evaluation and, if necessary, additional protective mitigation takes place (CEQA Guidelines Section15064.5(f)). If a resource is determined by the qualified archaeologist to constitute a "historical resource" or "unique archaeological resource", time allotment and funding sufficient to allow for implementation of avoidance measures, or appropriate mitigation, must be available.

- For unique archaeological resources, preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. All analysis proposals will be reviewed and approved by the consulting Tribes. Any historic archaeological material that is not Native American in origin shall be curated at a public, non-profit institution with a research interest in the materials within the County, if such an institution agrees to accept the material. If no institution accepts the archaeological material that is not Native American in origin, they shall be offered to the Gabrieleño Band of Mission Indians – Kizh Nation or a local school or historical society in the area for educational purposes.

- Native American human remains are defined in PRC 5097.98 (d)(1) as an inhumation or cremation, and in any state of decomposition or skeletal completeness. Funerary objects, called associated grave goods in PRC 5097.98, are also to be treated according to this statute. Health and Safety Code 7050.5 dictates that any discoveries of human skeletal material shall be immediately reported to the County Coroner and excavation halted until the coroner has determined the nature of the remains. If the coroner recognizes the human remains to be those of a Native American or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the NAHC and PRC 5097.98 shall be followed. More details on this process can be found in Mitigation Measure CUL-2 (see Section 3.4 – Cultural Resources).

- Archaeological and Native American monitoring and excavation during construction Projects will be consistent with current professional standards. All feasible care to avoid any unnecessary disturbance, physical modification, or separation of human remains and associated funerary objects shall be taken. Principal personnel must meet the Secretary of Interior standards for archaeology and have a minimum of 10 years of experience as a principal investigator working with Native American archaeological sites in southern California. The qualified archaeologist shall ensure that all other personnel are appropriately trained and qualified.

Based on the continued compliance with the above-referenced mitigation measure, the Project will not have a significant impact on tribal cultural resources.

3.18.5 CEQA Appendix G Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant impacts to tribal cultural resource if the Project would:

a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or

ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

As discussed above, with the exception of portions of Areas N and K, the majority of the Project site is an active mining and processing operation, and therefore the likelihood of uncovering undiscovered tribal cultural resources is considered low. Further, Area K has already been disturbed due to construction of the existing topsoil/subsoil storage berm, and Area N has been fully disturbed to accommodate the existing asphalt and recycle plants. Any tribal cultural resources visible during field surveys in these areas would likely have been subject to disturbance during these mining and construction activities. Nonetheless, Vulcan will continue to implement the existing mitigation measures outlined above (also presented in the 2020 EIR), to ensure no impacts to tribal cultural resource would occur under the Project. Through the continued implementation of these existing mitigation measures, no new or more severe potential impacts to tribal cultural resources beyond what was determined in the 1993 and 20202 EIRs would occur.

3.18.6 Addendum Conclusions

The Tribal Cultural Resources Section as set forth in the 2020 EIR and the conclusions adopted with certification of the 2020 EIR remain accurate and are unchanged by this Addendum. The 1993 EIR did not evaluate resource extraction in Planning Areas K or N, however, the Cultural Resources Assessment prepared for the 2020 EIR did not identify known tribal cultural resources in or near the Area Q Quarry and mitigation measures associated with tribal resources will continue to apply in order to address potential impacts to unknown, buried tribal cultural resources. As a result, the Project will result in or create any significant new tribal cultural resources impacts not previously assessed in the 1993 EIR or 2020 EIR.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	Less Than Significant	Less Than Significant Impact with Mitigation Incorporated	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

3.19 UTILITIES AND SERVICES SYSTEMS

A detailed discussion of utilities and service systems has been scoped out from this Addendum. The CEQA Appendix G Environmental Checklist contains the following criteria to identify whether a project would have a potentially significant impact on utilities and service systems, specifically if the Project would:

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

The Project would not result in an increased demand on utilities or public systems. No septic systems or commercial bathrooms would be located onsite. Onsite employees would continue to use existing portable bathroom facilities, which would continue to be regularly services by a local contractor. Cell phones and radios would continue to be used by onsite employees for communications. Additionally, no new or expanded natural gas infrastructure would be installed or utilized onsite.

Because the Project would not increase the number of on- or off-site employees, the rate at which waste is produced onsite would also not change or increase. Minimal quantities of trash waste generated by onsite employees would continue to be collected in appropriate containers and removed for disposal in accordance with applicable laws and regulations. No refuse would be disposed of on-site.

For these reasons, the Project would not create any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to utilities or service systems compared to those previously evaluated and disclosed within the 1993 EIR and the 2020 EIR.

3.20 WILDFIRE

3.20.1 Introduction

The CEQA Appendix G Environmental Checklist, provided in Section 3.20.5, was used to identify whether there would be a new significant impact or an increase in the severity of a previously identified environmental effect on wildfire when compared to the findings in the previous EIRs. The following sections summarize the conclusions from those EIRs followed by the addendum analysis and findings.

3.20.2 1993 EIR Conclusions

The 1993 EIR did not include an analysis of the potential impact that the Specific Plan would have related to wildfire. This analysis was not required in 1993 as a part of the CEQA Appendix G Guidelines or legislation in effect at that time.

3.20.3 2020 EIR Conclusions

The 2020 EIR included an evaluation of potential impacts related to wildfire associated with the Area Q Quarry project. (Draft 2020 EIR, pgs. 3.12-1 – 3.12-17; Final 2020 EIR, pg. 1-7.) The 2020 EIR found that, because the Area Q Quarry was located in or near a state responsibility area or lands classified as very high fire hazard severity zones, impacts related to wildfire were potentially significant. Therefore, the following project design features were included in the project and analyzed in the 2020 EIR:

- Local, state and federal regulations would be followed during the removal of structures and debris from the Project site.

- Excavation equipment would be inspected, maintained and repaired to ensure that the equipment is operating properly, and leaks are prevented to the maximum extent feasible.

- Major maintenance and repairs of equipment and vehicles would be conducted off-site.

- Hazardous materials and hazardous waste would be managed in accordance with applicable local, state and federal regulations. Any hazardous waste generated at the site would be disposed of at a permitted off-site facility.

- Blasting would not be used for the proposed mining operations.

  (Draft 2020 EIR, pg. 3.12-9.)

The 2020 EIR evaluated each of the CEQA Guidelines Appendix G Checklist topics associated with wildfire and found that the project would not substantially impair an adopted emergency response plan, exacerbate wildfire risks or expose occupants to uncontrolled wildfire, require infrastructure that would exacerbate fire risk, or expose people or structures to post-fire instability. No mitigation was required because the developed site will be largely free from debris and would

act as a barrier or "fire break" between the open spaces to the west and north and the residential neighborhoods to the south. Due to the lack of vegetation, structures and flammable materials that would be onsite during the life of the project, there would be little to no onsite fuel available to burn in the event of a wildfire.

3.20.4 Analysis of New or More Severe Project Impacts

The Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Wildfire.

The Project will amend the Specific Plan to permit mineral resource extraction in additional areas (portions of Areas K and N). These areas, along with Areas L, M, and N, were not analyzed for wildfire impacts in the 1993 EIR or 2020 EIR. The most recent wildfire hazard map published by the California Department of Forestry and Fire Protection (CalFire) shows that Areas K, L, M and N, are located within a "local responsibility area (LRA)" as a "Very High Fire Hazard Severity Zone (VHFHSZ).

Note, although the Project site is partially within a VHFHSZ, the following project design features that are intended to limit potential impacts associated with wildfire will continue to be implemented under the Project:

- Local, state and federal regulations would be followed during the removal of any structures and debris from the Project site (e.g., during site reclamation).
- Excavation equipment would continue to be inspected, maintained, and repaired to ensure that the equipment is operating properly, and leaks are prevented to the maximum extent feasible.
- Major maintenance and repairs of equipment and vehicles would continue to be conducted off-site.
- Hazardous materials and hazardous waste would continue to be managed in accordance with applicable local, state, and federal regulations. Any minimal quantity of hazardous waste generated at the site would continue to be disposed of at a permitted off-site facility.
- Blasting would not be used for the ongoing mining operations.

Based on these design features and other aspects of the Project, specifically the fact that onsite operations would involve the continued removal of drought impacted vegetation and debris on the site, the Project site would continue to serve as a man-made fire break and would therefore help alleviate wildfires that pass through the Project area. The Project would not expand beyond the existing permit boundaries, nor impact areas with significant existing vegetation or brush that could ignite.

As a result, the Project would not substantially impair an adopted emergency response plan, exacerbate wildfire risks or expose occupants to uncontrolled wildfire, require infrastructure that would exacerbate fire risk, or expose people or structures to post-fire instability. Conversely, because the site would remain cleared if vegetation due to active and ongoing mining and processing operations, the Project site would continue to act as a natural fire break. Accordingly,

the Project will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects related to Wildfire.

3.20.5 CEQA Appendix G Significance Criteria

Current CEQA Appendix G Checklist Criteria note that a project would have a potentially significant impacts related to wildfire if the Project would:

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

The Project does not propose any changes to Vulcan's existing production levels, mining systems, or processes. There would also be no increase in the number of onsite employees or employee vehicles, nor would there be additional haul trucks traveling on public roadways or entering onto or exiting the Project site via the existing access points. The existing site access points would be sufficient to evacuate onsite employees in the event of an emergency. Because the Project would not add additional vehicles to local roadways or alter the existing site access points, the Project would not result in increased congestion or obstruction of access along local roadways that would impair emergency response or public safety. Therefore, the Project would continue to have no impact on emergency response or evacuation plans.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

The Project site would remain cleared and excavated mining areas, barren soil, devoid of vegetation, and would therefore serve as a barrier between the Muscoy neighborhoods and industrial areas to the south and east in the event of a wildfire in the Cajon Creek Wash. Although the Project would result in deeper excavation to final depths of 240-feet below ground surface (bgs), the slopes angles would continue to not exceed 2:1 (horizontal to vertical), and would remain in compliance with applicable Surface Mining and Reclamation Act (SMARA) requirements, as well as the slope stability and safety requirements outlined in the approved Reclamation Plan. As such, the Project would not exacerbate a wildfire risk or expose Project personnel and vendors to increased risk due to uncontrolled wildfire.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing?

There would continue to be no permanent storage of fuel, lubricants, or hazardous materials on the Project site. The only hazardous materials present onsite would continue to be fuels and oils within the engines of operating mobile equipment, and these would continue to be stored properly using appropriate secondary containment. The Project would not require the installation or maintenance of associated infrastructure that may exacerbate fire risk.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, postfire slope instability, or drainage changes?

Implementation of the Project would not involve the placement of new permanent structures or construction of permanent buildings on the Project site. Existing conveyor systems and processing plants would continue to transport and process aggregate onsite. Additionally, mining slopes and temporary structures (e.g., conveyor, processing plants, etc.) would continue to be properly maintained and checked for potential safety hazards. Therefore, consistent with existing operations, the Project is not expected to expose people or structures onsite to significant risk as a result of runoff, postfire slope instability, or drainage changes.

3.20.6 Addendum Conclusions

The Wildfire Section as set forth in the 2020 EIR and the conclusions adopted with certification of the 2020 EIR remain accurate and are unchanged by this Addendum. The 1993 EIR did not evaluate wildfire impacts, however, continued mining and processing operations within Areas L, M, N, and Q, and the expansion of operations to Area K, would not result in new or more severe potential wildfire impacts under CEQA. Furthermore, the analysis above determined that onsite operations under the Project would involve the continued removal of drought impacted vegetation and debris on the site, meaning that the Project site would continue to serve as a man-made fire break and would help alleviate wildfire risk. Additionally, the project design features listed above, which were also included within the 2020 EIR, would continue to avoid impacts associated with interference with adopted emergency or evacuation plans. As a result, the Project will not create any significant new wildfire-related impacts.

Comparison of Environmental Conclusions Between 1993 EIR and 2020 EIR and the EIR Addendum

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?	N/A	Less Than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

CEQA Appendix G Environmental Significance Criteria	1993 EIR	2020 EIR	Addendum
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	N/A	Less Than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	N/A	Less Than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, postfire slope instability, or drainage changes?	N/A	Less Than Significant	No new significant environmental effect or increase in the severity of a previously identified environmental effect.

4.0 CEQA CONCLUSIONS

The Project, as discussed above, will not result in any new significant environmental effects or a substantial increase in the severity of previously identified significant effects that were considered in the 1993 EIR and 2020 EIR and, therefore, the Project does not require major revisions to the prior EIRs. The County and City have determined that this CEQA Addendum is appropriate and in compliance with CEQA, to account for the minor changes to the previously analyzed projects.

5.0 REFERENCES

California. (2019). *California Code, Public Resources Code – PRC*. State of California, Sacramento, CA.

CPUC. (2011). *California Energy Efficiency Strategic Plan.* Sacramento, CA: California Public Utilities Commission. Sacramento, CA.

DOC. (2015). *California Important Farmland: 1984-2018.* State of California, Department of Conservation.

ELMT. (2021). *Habitat Assessment for the Proposed Cajon Creek Consolidation Project.* Santa Ana, CA. ELMT Consulting.

Haley Aldrich. (2022). *CEQA Geology and Soils Screening Assessment.* Walnut Creek, CA. Haley Aldrich Incorporated.

Haley Aldrich. (2022). *Geotechnical Evaluation.* Walnut Creek, CA. Haley Aldrich Incorporated.

Irvine. (2015). *City of Irvine v. County of Orange* 238 Cal.App.4th 526, 539-540. Irvine, CA. City of Irvine, Plaintiff and Appellant, v. County of Orange.

Los Angeles. (1993). *A Local and Regional Monitor v. City of Los Angeles,* 16 Cal.App.4th 630,20 Cal.Rptr.2d 228. Los Angeles, CA. Superior Court of Los Angeles County for City of Los Angeles v. Sabrina S. Schilller for Plaintiff and Appellant.

Madera. (2010). *Melom v. City of Madera,* 183 Cal.App.4th 41, 106 Cal. Rptr. 3d 755 (Cal. Ct. App. 2010). Madera, CA. Patricia Melom, Plaintiff and Appellant, v. City of Madera.

San Bernardino. (1993). *Calmat Cajon Creek Project Specific Plan No. 90-01, Conditional Use Permit No. 90-31/Reclamation Plan Revised Conditions of Approval.* San Bernardino, CA. City of San Bernardino Mayor and Common Council.

Sespe (2021). *Hydrologic Investigation.* Ventura, CA. Sespe Consulting, Incorporated.

Sespe (2022). *Water Supply Assessment.* Ventura, CA. Sespe Consulting, Incorporated.

Sespe (2023). *CEQA Noise Memorandum for the Cajon Creek Quarry Consolidation Project.* Ventura, CA. Sespe Consulting, Incorporated.

Sespe. (2020). *Draft Environmental Impact Report, Area Q Quarry Project.* Ventura, CA. Sespe Consulting, Incorporated.

Sespe. (2023). *Air Quality, Health Risk and Climate Change CEQA Assessment.* Ventura, CA. Sespe Consulting, Incorporated.

Woodward-Clyde. (1991*). Draft Environmental Impact Report, Calmat Cajon Creek Specific Plan and Conditional Use Permit/Reclamation Plan*. San Diego, CA. Woodward-Clyde Consultants.

APPENDIX A

Figures



INDEX MAP

EXISTING LAND USE DESIGNATION:

- AGGREGATE PROCESSING PLANT SITE
- MINERAL RESOURCE EXTRACTION*
- LIGHT INDUSTRIAL BUFFER DEVELOPMENT

*NOTE: AREA M INCLUDES CONSTRUCTION MATERIALS PROCESSING AND DISTRIBUTION ENTITLEMENTS.



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DATE
DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

EXISTING PERMITTED CONDITIONS

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER 1

Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\CAD\Vulcan–CajonCreek–SitePlan–v0.4.dwg Jun 08, 2023, 8:51pm Pearce.Swerdfeger



INDEX MAP

PROJECT AREAS:

AREA INCLUDED IN PROJECT FOR MINERAL RESOURCE EXTRACTION

CURRENTLY APPROVED FOR MINERAL RESOURCE EXTRACTION*

*NOTE: AREA M INCLUDES CONSTRUCTION MATERIALS PROCESSING AND DISTRIBUTION ENTITLEMENTS.



N

400 0 400 800

SCALE IN FEET
SCALE: 1" = 400'
SCALE INDICATED IS BASED ON A 24" X 36" FORMAT PRINT

Vulcan Materials Company

SESPE CONSULTING, INC.
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374 Poli Street, Suite 200 • Ventura, CA 93001
(805) 275-1515 • www.sespeconsulting.com

OWNER / APPLICANT
VULCAN MATERIALS COMPANY -
WESTERN DIVISION
31 RANCHO CAMINO DRIVE, SUITE 300
POMONA, CALIFORNIA 91766

LAND USE CONSULTANT
SESPE CONSULTING, INC.
374 POLI STREET, SUITE 200
VENTURA, CALIFORNIA 93001
(805) 275-1515

REVISIONS

MARK	DATE	DESCRIPTION	BY
	06/07/23	INITIAL DRAFT	GJC

REVIEWED BY:
DATE
DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

PROPOSED CONDITIONS

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER 2

Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\CAD\Vulcan–CajonCreek–SitePlan–v0.4.dwg Jun 08, 2023, 8:50pm Pearce.Swerdfeger



INDEX MAP

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
CA MINE ID # 91-36-0188
MINING / RECLAMATION PLAN

PROPOSED USE:	EXISTING, PERMITTED AGGREGATE MINE, AGGREGATE PROCESSING FACILITIES, AND HOT MIX ASPHALT PLANT
MINERAL COMMODITY:	SAND AND GRAVEL
APPLICANT / OPERATOR:	VULCAN MATERIALS COMPANY - WESTERN DIVISION 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766 (818) 553-8800
PLAN DESIGN:	SESPE CONSULTING, INC. 374 POLI STREET, SUITE 200 VENTURA, CALIFORNIA 93001 (805) 275-1515
LEAD AGENCY:	COUNTY OF SAN BERNARDINO LAND USE SERVICES DEPARTMENT 385 N. ARROWHEAD ROAD SAN BERNARDINO, CALIFORNIA 93001 (909) 387-4002
LAND USE ZONING:	SEE SHEET 2
BASE MAP SOURCES:	SEE TOPOGRAPHY SOURCES (RIGHT)

SURROUNDING LAND USES

DIRECTION	LAND USE DESIGNATION	DESCRIPTION
NORTH	UNDEVELOPED LAND & INDUSTRIAL DEVELOPMENT	UNDEVELOPED LAND / A LARGE INDUSTRIAL WAREHOUSE OCCURS NORTH OF THE PROJECT SITE AND LIGHT INDUSTRIAL DEVELOPMENT TO THE NORTHEAST.
SOUTH	MUSCOY / SINGLE RESIDENTIAL - 1-ACRE MINIMUM (MS/RS-1)	THE DEVIL CREEK DIVERSION CHANNEL RUNS DOWN THE SOUTHERN BOUNDARY OF THE SITE, AND THE RESIDENTIAL COMMUNITY OF MUSCOY IS LOCATED DIRECTLY SOUTH OF THIS DIVERSION CHANNEL.
EAST	INDUSTRIAL HEAVY (IH)	INDUSTRIAL DEVELOPMENTS ARE LOCATED EAST OF THE SITE, ACROSS CAJON BOULEVARD.
WEST	UNDEVELOPED LAND	THE LYTLE CREEK/CAJON CREEK DRAINAGE LOCATED TO THE WEST.

SHEET INDEX

FIGURE 1: SITE OVERVIEW - EXISTING CONDITIONS
FIGURE 2: PROPERTY INFORMATION
FIGURE 3: MINING PLAN
FIGURE 4: RECLAMATION PLAN
FIGURE 5: SECTION A-A'
FIGURE 6: SECTION B-B'
FIGURE 7: SITE PLAN

DATA SOURCES

PROPERTY BOUNDARIES:

ALTA SURVEY PREPARED APRIL 2006 BY DAWSON SURVEYING, INC.

ALTA SURVEY PREPARED JUNE 2008 BY GORDON EDWARDS, PLS #6678 FOR THE LOT LINE ADJUSTMENT FOR FOR APN 0262-241-26.

SURVEY DATA PREPARED SEPTEMBER 2019 BY JOSEPH PADILLA, PLS #7557 FOR THE LOT LINE ADJUSTMENT OF APN: 0262-221-17.

TOPOGRAPHY:

TOPOGRAPHY WITHIN AREAS K, L, M, AND N SOURCED FROM DIGITAL MAPPING, INC. (DENNIS HERBERT DILLMAN, PLS 5424), FLOWN 05/12/2014.

TOPOGRAPHY OUTSIDE AREAS K, L, M, AND N SOURCED FROM DIGITAL MAPPING, INC., FLOWN 8/30/2005.

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88

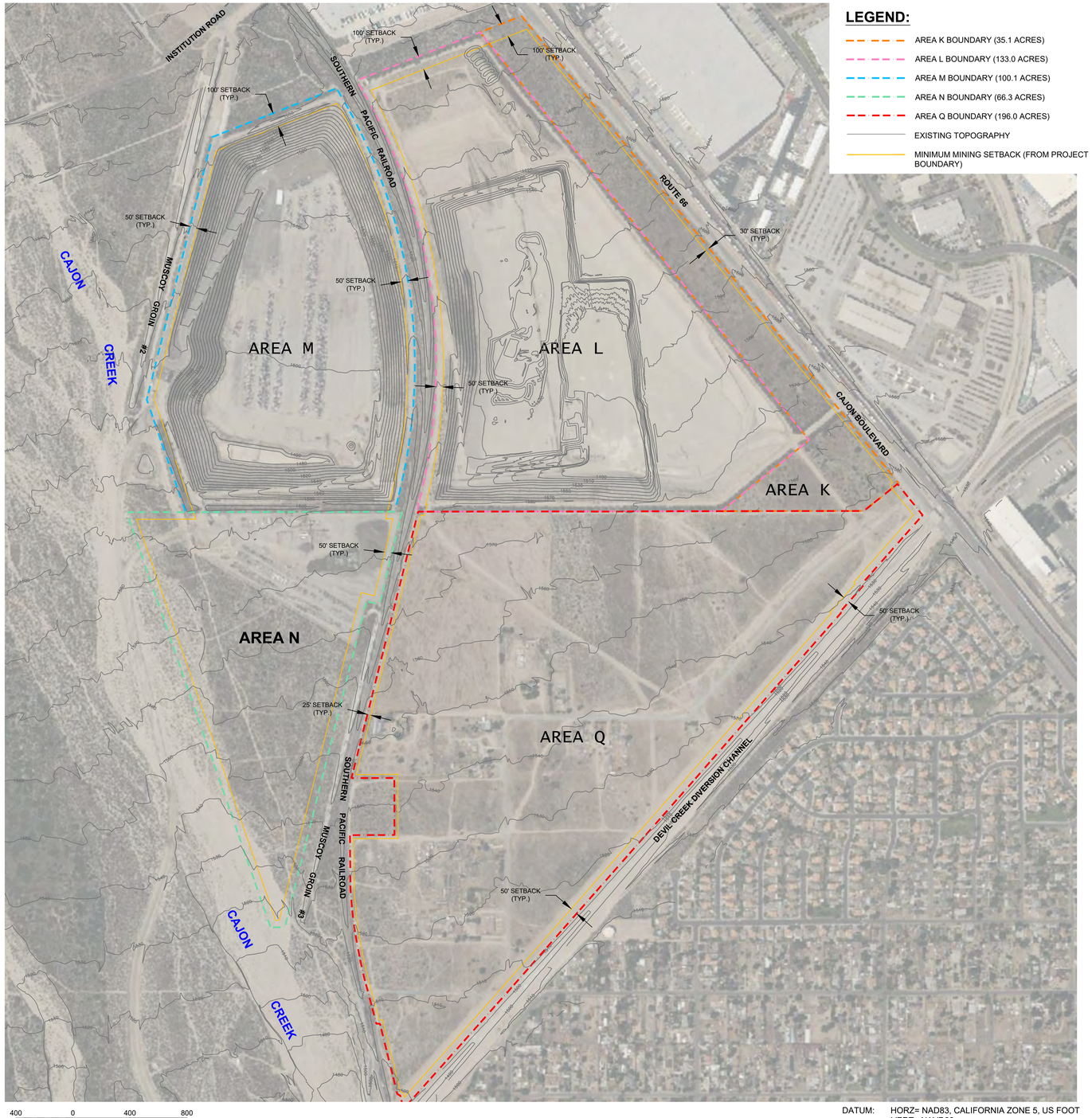
CONTOUR INTERVAL: 10 FEET

AERIAL:

BING IMAGERY, 2022

PROJECT SITE INFORMATION

EASEMENT:	PUBLIC UTILITIES EASEMENTS TO BE VACATED PRIOR TO MINING WITHIN THESE AREAS
MINERAL BEING EXTRACTED:	SAND AND GRAVEL
ADJACENT AREA:	SEE SHEET 3
PROJECT AREA:	SEE SHEET 3
PROTECTED PLANTS:	NONE
GROUNDWATER LEVEL:	+260 FEET BELOW GROUND SURFACE (SEE SHEET 5 AND 6)
EXISTING LAND USE DESIGNATION:	SEE TABLE SHEET 2
PROPOSED LAND USE DESIGNATION:	SEE TABLE SHEET 2
ELECTRICITY:	SOUTHERN CALIFORNIA EDISON (SCE) P.O. BOX 800 ROSEMEAD, CA 91770 (800) 655-4555
GAS:	N/A (NO NATURAL GAS AND/OR PROPANE SERVICE REQUIRED)
WATER:	EXISTING WATER WELL LOCATED WITHIN AREA M
SEWER:	EXISTING PORTABLE SANITATION FACILITIES LOCATED WITHIN AREA L
TELEPHONE:	N/A (NO FIXED LANDLINE TELEPHONE SERVICE REQUIRED)



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MARK	DATE	DESCRIPTION	BY
	12/20/22	INITIAL DRAFT	GJC

REVIEWED BY: DATE DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

SITE OVERVIEW - EXISTING CONDITIONS

SCALE: HORIZ. AS SHOWN VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER 3

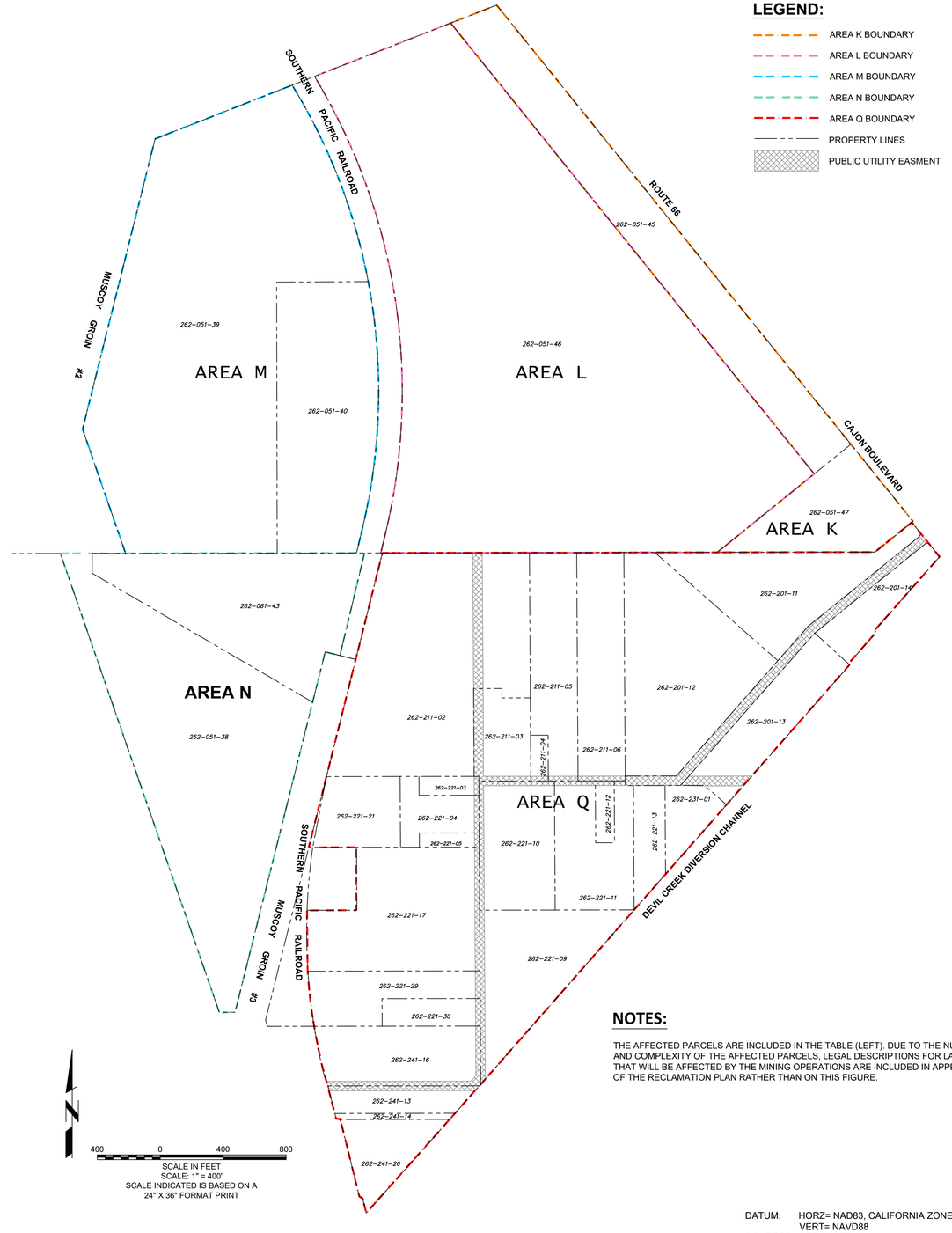


INDEX MAP

PROPERTY INFORMATION

PLANNING AREA	PARCEL NUMBER	AREA (ACRES)	PROPERTY OWNER	LAND USE DESIGNATION	CURRENT MINERAL RIGHTS INTEREST HOLDER
AREA Q	0262-201-11-0000	12.45	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-201-12-0000	20.15	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-201-13-0000	8.21	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-201-14-0000	4.16	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-02-0000	32.60	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-03-0000	4.60	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-04-0000	0.75	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-05-0000	9.26	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-06-0000	10.00	ARUNDEL COMPANY, LLC 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	ARUNDEL COMPANY, LLC P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-03-0000	1.05	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-04-0000	3.30	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-05-0000	0.79	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-09-0000	12.50	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-10-0000	9.04	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-11-0000	8.40	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-12-0000	1.10	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-13-0000	3.11	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-17-0000	16.89	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-21-0000	5.32	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-29-0000	6.03	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-30-0000	2.38	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014

PLANNING AREA	PARCEL NUMBER	AREA (ACRES)	PROPERTY OWNER	LAND USE DESIGNATION	CURRENT MINERAL RIGHTS INTEREST HOLDER
AREA Q	0262-231-01-0000	2.90	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-241-13-0000	3.56	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-241-14-0000	0.60	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-241-16-0000	8.74	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-241-26-0000	4.85	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA N	0262-051-38-0000	177.08	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA M	0262-051-39-0000	77.38	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA M	0262-051-40-0000	22.72	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA K	0262-051-45-0000	24.79	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	LIGHT INDUSTRIAL (IL) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA L	0262-051-46-0000	132.35	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA K	0262-051-47-0000	11.28	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA N	0262-061-43-0000	21.23	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014



NOTES:

THE AFFECTED PARCELS ARE INCLUDED IN THE TABLE (LEFT). DUE TO THE NUMBER AND COMPLEXITY OF THE AFFECTED PARCELS, LEGAL DESCRIPTIONS FOR LANDS THAT WILL BE AFFECTED BY THE MINING OPERATIONS ARE INCLUDED IN APPENDIX E OF THE RECLAMATION PLAN RATHER THAN ON THIS FIGURE.

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88
SOURCES: SEE SHEET 1

Vulcan Materials Company

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LAND USE CONSULTANT
SESPE CONSULTING, INC.
374 POLI STREET, SUITE 200
VENTURA, CALIFORNIA 93001
(805) 275-1515

REVISIONS

MARK	DATE	DESCRIPTION	BY
	06/12/22	INITIAL DRAFT	GJC

REVIEWED BY:
DATE
DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

PROPERTY INFORMATION

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER
4

Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\CAD\Consolidated Mine & Rec Plan\Vulcan–CajonCreek–ConsolidatedMP–v1.0.dwg Jun 12, 2023, 7:54pm Pearce.Swerdfeger

APPENDIX B

Air Quality, Health Risk and Climate Change CEQA Assessment
(Sespe Consulting, Inc. – 2023)

SESPE CONSULTING, INC.
A Trinity Consultants Company
374 Poli Street, Suite 200 • Ventura, California 93003 • Office (805) 275-1515 • Fax (805) 667-8104

AIR QUALITY, HEALTH RISK AND CLIMATE CHANGE CEQA ASSESSMENT

CAJON CREEK CONSOLIDATION PROJECT

Vulcan Materials Company – Western Division
San Bernardino, California

June 2023

Prepared by: Sespe Consulting, Inc.
374 Poli Street, Suite 200
Ventura, California 93001
(805) 275-1515

Prepared for: Vulcan Materials Company – Western Division
31 Rancho Camino Drive, Suite 300
Pomona, California 91766
(818) 553-8800

SESPE CONSULTING, INC.
A Trinity Consultants Company
374 Poli Street, Suite 200 • Ventura, California 93003 • Office (805) 275-1515 • Fax (805) 667-8104

Air Quality, Health Risk and Climate Change CEQA Assessment

Cajon Creek Consolidation Project
Vulcan Materials Company – Western Division
San Bernardino, California

June 2023

CONTENTS

1.0 INTRODUCTION 1
2.0 PREVIOUS CEQA EVALUATIONS & CONCLUSIONS 2
2.1 1993 EIR (Cajon Creek Quarry) 2
2.2 2020 EIR Conclusions 3
3.0 PROJECT CEQA EVALUATION 5
3.1 Project Air Quality and GHG Summary 5
3.2 Health Risk Assessment 7
4.0 CONCLUSIONS 8

TABLES

Table 1 Comparison of 1993 and 2020 EIR to Project 5

APPENDICES

A. Figures
B. Cajon Creek Consolidation Project – Health Risk Assessment (Sespe Consulting, 2023)

Air Quality, Health Risk and Climate Change CEQA Assessment

Cajon Creek Consolidation Project
Vulcan Materials Company – Western Division
San Bernardino, California

June 2023

1.0 INTRODUCTION

Vulcan Materials Company – Western Division ("Vulcan") operates two separate and adjacent aggregate surface mining and processing operations in the City and County of San Bernardino. The existing Cajon Creek Quarry is located in the City of San Bernardino ("City"), and the existing Area Q Quarry is located in the County of San Bernardino ("County"). The Cajon Creek Quarry was initially approved by the City in 1993 as part of the CalMat Cajon Creek Specific Plan (SP No. 90-01, et al.), and analyzed within an Environmental Impact Report (EIR) published in the same year (the "1993 EIR"). In 2020, the County approved a zone change, use permit, and reclamation plan for mineral extraction in the area immediately south of the Cajon Creek Quarry known as the "Area Q" Quarry, which was evaluated within a separate EIR certified by the County in 2020 (the "2020 EIR").

In order to increase the operational efficiency of these existing mining operations, Vulcan is proposing to combine the Cajon Creek (comprised of operational/planning Areas K, L, M, and N) and Area Q quarries into one quarry under one Surface Mining and Reclamation Act (SMARA) Reclamation Plan. For this reason, the project is called the "Cajon Creek Consolidation Project" (hereinafter the "Project"). The Project involves the following changes to the existing entitlements:

1. Mining in Area K, previously designated for light industrial use, to a depth of 240-feet below ground surface (bgs).
2. Mining in Areas L, M and Q to a target depth of 240-feet bgs, an increase from the previously permitted 120-feet bgs.
3. Mining in the northern portion of Area N, currently designated for mineral processing, to a depth of 120-feet bgs; followed by mineral processing in Area N, as Area M is mined to a final depth of 240-foot bgs.
4. Creating two consolidated mining pits. One consisting of Areas K, L and Q, and the other consisting of Areas N and M.

No other operational changes are proposed as part of the Project. Specifically, the pace, nature, equipment used, and traffic generation/routes would not change from what was previously evaluated in the 1993 and 2020 EIRs. See Figures 1 through 3 (Appendix A) attached which show the Project site, and the operational areas described above (i.e., Areas K, L, M, N, and Q).

In accordance with the California Environmental Quality Act (CEQA), this memorandum has been prepared to identify whether there would be new significant impacts or an increase in the severity of a previously identified environmental effects related to air quality, health risk and greenhouse gases as a result of the Project, when compared to the findings identified in the previous 1993 and 2020 EIRs. We have evaluated the incremental differences in air quality, health risk and greenhouse gas impacts resulting from the Project compared to the 1993 and 2020 EIRs, and conclude that the following findings can be made:

- **Air Quality Impacts:** The Project would reduce the carbon monoxide, hydrocarbons, nitrogen oxides, particulates and sulfur oxides emissions from those evaluated in the 1993 and 2020 EIRs. This is due to efficiencies achieved through operational changes; improvements to equipment efficiency and emissions controls; and to overall improvements in regional air quality since 1993. The 1993 and 2020 EIR air quality analyses are provided in Appendices B and C, respectively.
- **Greenhouse Gas Impacts (GHG):** Evaluation of GHG emissions were not required in 1993; therefore, the 1993 EIR omitted GHG analysis. A GHG analysis was included within the 2020 EIR. As discussed in Section 3.1, the GHG emissions associated with the proposed Project would be consistent with or less than the GHG emissions associated with the 1993 and 2020 projects.
- **Health Risk Assessment (HRA):** Health risk assessment was prepared in response to comments on the 1993 EIR and an HRA was prepared for the 2020 EIR. As discussed in Sections 3.1 and 3.2 below, potential health risk concerns associated with the Project would remain within thresholds.

In summary, the Project would not result in any new significant environmental effect or increase in the severity of a previously identified environmental effect compared to the findings identified in the previous 1993 and 2020 EIRs.

2.0 PREVIOUS CEQA EVALUATIONS & CONCLUSIONS

2.1 1993 EIR (Cajon Creek Quarry)

The 1993 EIR included discussions of the air quality environmental setting, potential impacts and mitigation measures related to the CalMat Cajon Creek Specific Plan, of which the Cajon Creek Quarry is a part. The 1993 EIR relied on findings from an air quality impact analysis prepared by Giroux & Associates in July 1991 (Giroux & Associates, 1991). The evaluation of air quality impacts in the 1993 EIR did not involve an evaluation of GHG emissions. The potential sources of air quality impacts associated with the 1993 project were fugitive dust from scattered sources and processing equipment, increased dust emissions from rock production and distribution, dust emissions during Santa Ana wind conditions, aggregate product hauling and industrial park vehicular emissions of reactive organic gases (ROG), carbon dioxide (CO_2), and nitrogen oxides (NO_X), and increased stationary source emissions from light and heavy industrial uses and asphaltic concrete plants.

The 1993 EIR determined that with implementation of the identified mitigation measures, the project would not have significant impacts to air quality, with the exception of combustion emissions and particulate matter (i.e., PM_{10}) during Santa Ana wind conditions. A statement of overriding considerations was approved for significant and unavoidable impacts associated with combustion emissions and PM_{10} during Santa Ana conditions.

The 1993 EIR also found that stationary source emissions, including odors from asphalt and concrete production, would be regulated by SCAQMD, which would require processing facilities to minimize potential air quality impacts. Therefore, the 1993 EIR concluded that compliance with SCAQMD regulations with respect to asphalt and concrete manufacturing would reduce potential air quality impacts associated with stationary source emissions to a level of non-significance.

The mitigation measures adopted as part of the 1993 EIR include the following:

- *Control of fugitive emissions shall result from good operational practices, proper housekeeping and use of supplemental dust suppression measures. Minimum implementation action of the mitigation measures will be to meet the requirement of AQMD Rule 401.*
- *These activities are controlled by SCAQMD permit conditions and by specified control measures in the District's Best Available Control Technology (BACT) guidelines. Material handling and in-plant travel will be controlled through a program of paving offsite access road and major intra-plant travel paths.*
- *Material transport to the fixed plant site in Planning Area N will utilize a conveyer.*
- *If some or all materials transfer between mining and processing Planning Area occurs via off-road hauling, the associated dust impact would be mitigated through implementation of dust control measures required by SCAQMD as a provision of permitting.*
- *SCAQMD requirements under Rule 401 shall be implemented. A berm system, in conjunction with a windbreak, will be included in the landscaping north of the Planning Area N processing plant to reduce wind through the plant. A line of landscaping near the southern site boundary will also trap dust picked up by the winds.*
- *The impact potential related to dust generation during Santa Ana wind conditions shall be reduced as a result of industrial developments within the Specific Plan Planning Areas. This mitigation will result from paving over open areas, the presence of buildings, berming, and landscape. The features will reduce the amount of erodible surface and increase surface roughness, thus creating breaks in the wind field.*
- *Dust emissions from the batch plant and asphaltic concrete production will be controlled through standard design features required by SCAQMD rules. No mitigation is required.*
- *Aggregate facilities access/egress shall be designed to minimize use of local arterial roadways or areas of existing or potential future air quality sensitivity.*
- *Compliance with SCAQMD regulations for emissions off sets (SCAQMD Regulation XIII) upwind of Cajon Creek, and the use of BACT on the plant.*

The 1993 EIR found that potential air quality impacts could be mitigated to a level of insignificance following application of the mitigation measures listed above, except for significant and unavoidable impacts from dust and combustion emissions discussed previously.

2.2 2020 EIR Conclusions

The 2020 EIR assessed impacts of mining in Area Q on air quality, health risk and climate change. The potential sources of air quality impacts associated with the 2020 project were offroad engine emissions, wind erosion, bulldozing/quarrying, and aggregate handling in the mining area. The assessment of potential air quality impacts in the 2020 EIR incorporated the following assumptions and project design features:

- The excavation and associated equipment would operate in compliance with applicable 2020 air quality regulations.
- Diesel engines would comply with applicable state regulations (i.e., ATCM). This includes labeling of off-road equipment with registration numbers assigned by CARB, establishment of an idling policy, and limiting idle time to less than five minutes (13 CCR §2449).

- Fugitive dust emissions would be controlled through implementation of the controls and compliance with performance measures in SCAQMD Rules 403 and 1157.
- Conveyors used to transport aggregate materials would be powered by grid electricity and replace existing conveyors within the current mining site (Area L).
- The Project is in San Bernardino County, which is among the counties that are unlikely to contain serpentine and ultramafic rock (OPR, 2000). Serpentine or ultramafic rock could contain naturally occurring asbestos (NOA). No serpentine or ultramafic rock has been found on the Project site or in the vicinity of the Project. The Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR § 93105) allows the APCO from the local air district to exempt materials produced by facilities that mine alluvial deposits as would be the case for the Project. Therefore, asbestos was excluded from HRA performed for the Project.
- The Project would not store hazardous substances or acutely hazardous substances in quantities that would be subject to chemical accident prevention provisions of the CAA or the implementing regulation (40 CFR Part 68).
- The Project would not result in any off-site truck trips.
- Aggregate excavation/production rates and equipment used to excavate would remain the same or decrease from existing conditions, subject to market demand.
- Emissions characteristics of off-road vehicle engines reflect the fleet currently operating onsite. Future year fleets considered in the cancer risk assessment incorporate engine turnover as required by the In-Use Off-road Engine ATCM.
- The assessment conservatively assumes that the project would excavate aggregates for 15 years, but it is possible that the Project would operate up to 30 years. It is conservative to assume mining would take place in this timeframe, as a 15-year span results in higher levels of exposure concentrated on modeled receptors during periods of increased cancer risk due to age sensitivity factors (ASF).
- Mining operations in Area L were relocated to Area Q, such that material extraction was not occurring in both areas at the same time.

Actual achieved production data at the adjacent Cajon Creek Quarry were used for the baseline in the 2020 EIR. The EIR included HRA that was prepared using methods from the appropriate HRA Guidelines (OEHHA, 2015), and SCAQMD Rule 1401 guidance materials. The 2020 EIR found that emissions from the mining operations at the Area Q Quarry would not result in significant air quality impacts and that no mitigation was required.

Total GHG emissions from the Area Q project were also estimated as part of the 2020 EIR. It was determined that the incremental GHG emissions for the Area Q Quarry was approximately 45 metric tons of carbon dioxide equivalent per year (CO_2e MT/year), well below the applicable SCAQMD screening threshold for GHG emissions (i.e., 10,000 CO_2e MT/year). Because the GHG emissions associated with the Area Q Quarry project were less than the applicable SCAQMD screening threshold, the 2020 EIR determined that the Area Q Quarry would not result in significant impacts associated with GHG emissions.

3.0 PROJECT CEQA EVALUATION

3.1 Project Air Quality and GHG Summary

As summarized above, the only operational changes under the Project would be mining in Area K to a depth of 240-feet bgs, mining in the northern portion of Area N to a depth of 120-feet bgs, and increasing the depth from 120-feet bgs to 240-bgs in Areas L, M, and Q. Once Area N has been excavated to 120-feet bgs, the processing operations would be relocated from the pit in Area M to the pit in Area N. This is to allow for deeper excavation in Area M to 240-feet bgs. See Figure 2 which shows the final design and slope contours of the consolidated excavation pits and the individual planning areas.

Mining operations would be conducted in a phased approach starting in Areas L and K then moving into Area Q and on to Areas N and M. Resource extraction would be conducted in only one planning area at a time. The mining operations would be conducted at the same pace and intensity as analyzed in the prior EIRs. No changes are proposed to mining methods, processing operations, annual production, or phasing. Table 1 below compares the operational parameter analyzed within the 1993 and 2020 EIRs to those that apply to the Project.

Table 1 Comparison of 1993 and 2020 EIR to Project

Operational Features	Cajon Creek & Area Q Quarries	Proposed Project	Project Change
Mining & Processing Area	Total Site: 494 acres – Area L = 130.5 acres – Area M = 97.5 acres – Area N = 70 acres – Area Q = 196 acres	Total Site = 485 acres – Area K = 35 acres – Area L = 133 acres – Area M = 100 acres – Area N = 21 acres[A] – Area Q = 196 acres	9-acre reduction in mining and processing area (due to reduced operational footprint in Area N)
Estimate Annual Production	1.3 to 3.1 million tons per year	1.3 to 3.1 million tons per year	No change.
Mining Depth	120-feet bgs	240-feet bgs	Additional +120-feet bgs
Mining / Processing Operations	Excavation using mobile equipment (excavators, scrapers, dozers, loaders, etc.). Material processing at Vulcan's permitted facilities.	Excavation using mobile equipment (excavators, scrapers, dozers, loaders, etc.). Material processing at Vulcan's permitted facilities.	No Change
Equipment	– Dozers/Scrapers – Loaders – Grader – Mobile Water Truck	– Dozers/Scrapers – Loaders – Grader – Mobile Water Truck	No Change
Operational Hours	12-hour period between 6:00 a.m. and 10:00 p.m., Monday through Saturday.	12-hour period between 6:00 a.m. and 10:00 p.m., Monday through Saturday.	No Change
Onsite Employees	10 to 15 employees (at one time)	10 to 15 employees (at one time)	No Change

Operational Features	Cajon Creek & Area Q Quarries	Proposed Project	Project Change
Material Transport	Onsite: Existing conveyance infrastructure and onsite equipment. Offsite: Existing ingress and egresses.	Onsite: Existing conveyance infrastructure and onsite equipment. Offsite: Existing ingress and egresses.	No Change
Electricity Source	Source: Existing Southern California Edison (SCE) infrastructure.	Source: Existing Southern California Edison (SCE) infrastructure.	No Change
Reclaimed End Use	Open Space	Open Space	No Change

A – Vulcan placed the southern portion of Area N, consisting of approximately 49 acres, into a permanent conservation easement.

As shown in Table 1, there would be no Project operational changes that would change or increase criteria and non-criteria pollutants or GHG emissions. The following sections further discuss each potential emissions source/operational aspect of the Project, as compared to the 1993 and 2020 projects.

Aggregate Mining & Stockpiling: Sand and gravel (i.e., aggregate) would continue to be extracted from the Project site using existing mobile equipment. As stated above, the pace of aggregate extraction would be unchanged (approximately 1.3 to 3.1 million tons per year), and would be conducted with the same mobile equipment currently operating onsite (e.g., dozers, loaders, scarpers, etc.). As such, equipment diesel emissions and fugitive dust due to onsite mining would remain the same as was evaluated within the 1993 and 2020 EIRs.

Resource recovery would generally occur in the same locations, specifically Areas L, M and Q; however, mining would also occur in Areas K and N, which was not evaluated in the previous EIRs. Area N was reviewed and approved for processing operations in the 1993 EIR. Although mining in these areas could generate dust emissions from excavation that were not previously considered, dust emissions from mining in Areas K and N would be the same as the dust emissions analyzed and disclosed in the previous EIRs for Areas L, M and Q. In addition, as shown on Figure 1, Areas N and K are generally further away from potential receptors located to the south (community of Muscoy) when compared to mining operations in Areas L and Q, and therefore air pollutants would be more dispersed and less concentrated than those that were evaluated in locations closer to the receptors. Therefore, mining in Areas N and K would not create new or more severe dust and health risk impacts to those sensitive receptors compared to what was determined in the 1993 and 2020 EIRs.

In addition, Area K was previously designated for light industrial development, and the potential air impacts of the full build-out of an industrial business park was evaluated within the 1993 EIR. Vehicle and operational emissions associated with the previously proposed light industrial development in Area K would generate far more air emissions due to increased vehicle activity, and GHG emissions due to increased electricity consumption when compared to the proposed mining operations under the Project. Therefore, mining in Area K would decrease potential impacts to nearby sensitive receptors compared to what was determined in the 1993 EIR.

Material Processing: Aggregate material processing would continue to be allowed In Area M and then relocated to the bottom of the pit in the northern portion of Area N. Aggregate processing within these areas was evaluated

in the 1993 EIR. The 1993 EIR air analysis assumed processing activities in these areas would include an aggregate plant, a ready-mixed concrete plant, an asphaltic concrete plant, a cement-treated base plant, a Portland cement concrete, and asphaltic concrete re-crush operations, as well as other similar and related facilities. Because onsite processing operations under the Project would not substantially change from the 1993 project, operation of the aggregate processing and recycle plants would not result in any new or more severe impacts compared to what was determined in the 1993 and 2020 EIRs.

Material Transport & Employee Vehicles: Because the facility production rate, number of onsite employees, and hours of operation would not change, the air emissions from haul trucks and employee vehicles would also not change. The Project would not increase the number of offsite haul trucks or employee vehicles on public roads from those that were previously evaluated in the 1993 and 2020 EIRs.

Electricity: Electricity consumption represents an indirect source of GHG emissions. Electricity would continue to be used onsite to operate the conveyors and the processing activities. Because the pace and method of aggregate extraction and processing would not change or increase as a result of the Project, electricity consumption, and therefore indirect GHG emissions, would also not change or increase as compared to the 1993 and 2020 projects.

3.2 Health Risk Assessment

Because the Project would allow for mining activities in two new areas not previously evaluated in 1993 or 2020, specifically Area K and Area N, an updated Health Risk Assessment (HRA) was prepared by Sespe in May 2023 (Sespe Consulting, 2023). The HRA was performed to evaluate the effects of toxic air contaminants (TACs), including diesel particulate matter (DPM) from vehicle engines and various substances found in fugitive dust emissions (i.e., metals and respirable crystalline silica), to determine whether the change in location of mining activities to Areas K and N would expose any sensitive receptors to substantial pollutant concentrations. Sespe's HRA is included in Appendix B.

As presented in Sespe's report, health risks associated with the Project would remain less than significant under CEQA, and similar to health risk impacts addressed in the 1993 and 2020 EIRs. Accordingly, the Project would not expose any sensitive receptors to substantial pollutant concentrations, nor would it change or increase potential health risk impacts compared as compared to the 1993 and 2020 projects.

4.0 CONCLUSIONS

As discussed above, mining in Areas K and N would require minimal operational changes from the projects already reviewed under CEQA in the 1993 and 2020 EIRs. As demonstrated above, the proposed Project would not result in any new significant environmental impacts or more severe environmental impacts related to air quality and GHG emissions, or health risk impacts, compared to what was analyzed in those previous EIRs.

Additionally, since certification of the 1993 EIR and 2020 EIR, development in the vicinity of the Project site has not created the potential for increased health risk impacts. The distance to the nearest sensitive residential land uses has not changed, as the closest homes in 1993 and 2020 (the homes located in the nearby community of Muscoy) continue to be the closest homes to the site today. No new residential neighborhoods have been developed in the immediate Project area. Further the 1993 EIR assumed much of the onsite processing would occur at-grade, where there is a greater exposure to prevailing winds (i.e., Santa Ana winds) that would potentially increase fugitive dust emissions. By placing the processing operations within the excavation pits at Areas M and N under the Project, the sides of the pit wall would act as natural wind barriers that would decrease the potential for fugitive dust to impact nearby Muscoy.

The existing conditions of approval, project design features and mitigation measures that reduce potential air quality impacts, including those outlined above from the 1993 and 2020 EIRs will continue to be implemented as applicable. Therefore, the Project would not result in a new significant environmental effect or increase in the severity of a previously identified environmental effect when compared to those addressed in the 1993 EIR and 2020 EIR.

APPENDIX A

Figures



INDEX MAP

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
CA MINE ID # 91-36-0188
MINING / RECLAMATION PLAN

PROPOSED USE:	EXISTING, PERMITTED AGGREGATE MINE, AGGREGATE PROCESSING FACILITIES, AND HOT MIX ASPHALT PLANT
MINERAL COMMODITY:	SAND AND GRAVEL
APPLICANT / OPERATOR:	VULCAN MATERIALS COMPANY - WESTERN DIVISION 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766 (818) 553-8800
PLAN DESIGN:	SESPE CONSULTING, INC. 374 POLI STREET, SUITE 200 VENTURA, CALIFORNIA 93001 (805) 275-1515
LEAD AGENCY:	COUNTY OF SAN BERNARDINO LAND USE SERVICES DEPARTMENT 385 N. ARROWHEAD ROAD SAN BERNARDINO, CALIFORNIA 93001 (909) 387-4002
LAND USE ZONING:	SEE SHEET 2
BASE MAP SOURCES:	SEE TOPOGRAPHY SOURCES (RIGHT)

SURROUNDING LAND USES

DIRECTION	LAND USE DESIGNATION	DESCRIPTION
NORTH	UNDEVELOPED LAND & INDUSTRIAL DEVELOPMENT	UNDEVELOPED LAND / A LARGE INDUSTRIAL WAREHOUSE OCCURS NORTH OF THE PROJECT SITE AND LIGHT INDUSTRIAL DEVELOPMENT TO THE NORTHEAST.
SOUTH	MUSCOY / SINGLE RESIDENTIAL - 1-ACRE MINIMUM (MS/RS-1)	THE DEVIL CREEK DIVERSION CHANNEL RUNS DOWN THE SOUTHERN BOUNDARY OF THE SITE, AND THE RESIDENTIAL COMMUNITY OF MUSCOY IS LOCATED DIRECTLY SOUTH OF THIS DIVERSION CHANNEL.
EAST	INDUSTRIAL HEAVY (IH)	INDUSTRIAL DEVELOPMENTS ARE LOCATED EAST OF THE SITE, ACROSS CAJON BOULEVARD.
WEST	UNDEVELOPED LAND	THE LYTLE CREEK/CAJON CREEK DRAINAGE LOCATED TO THE WEST.

SHEET INDEX

FIGURE 1: SITE OVERVIEW - EXISTING CONDITIONS
FIGURE 2: PROPERTY INFORMATION
FIGURE 3: MINING PLAN
FIGURE 4: RECLAMATION PLAN
FIGURE 5: SECTION A-A'
FIGURE 6: SECTION B-B'
FIGURE 7: SITE PLAN

DATA SOURCES

PROPERTY BOUNDARIES:

ALTA SURVEY PREPARED APRIL 2006 BY DAWSON SURVEYING, INC.

ALTA SURVEY PREPARED JUNE 2008 BY GORDON EDWARDS, PLS #6678 FOR THE LOT LINE ADJUSTMENT FOR FOR APN 0262-241-26.

SURVEY DATA PREPARED SEPTEMBER 2019 BY JOSEPH PADILLA, PLS #7557 FOR THE LOT LINE ADJUSTMENT OF APN: 0262-221-17.

TOPOGRAPHY:

TOPOGRAPHY WITHIN AREAS K, L, M, AND N SOURCED FROM DIGITAL MAPPING, INC. (DENNIS HERBERT DILLMAN, PLS 5424), FLOWN 05/12/2014.

TOPOGRAPHY OUTSIDE AREAS K, L, M, AND N SOURCED FROM DIGITAL MAPPING, INC., FLOWN 8/30/2005.

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88

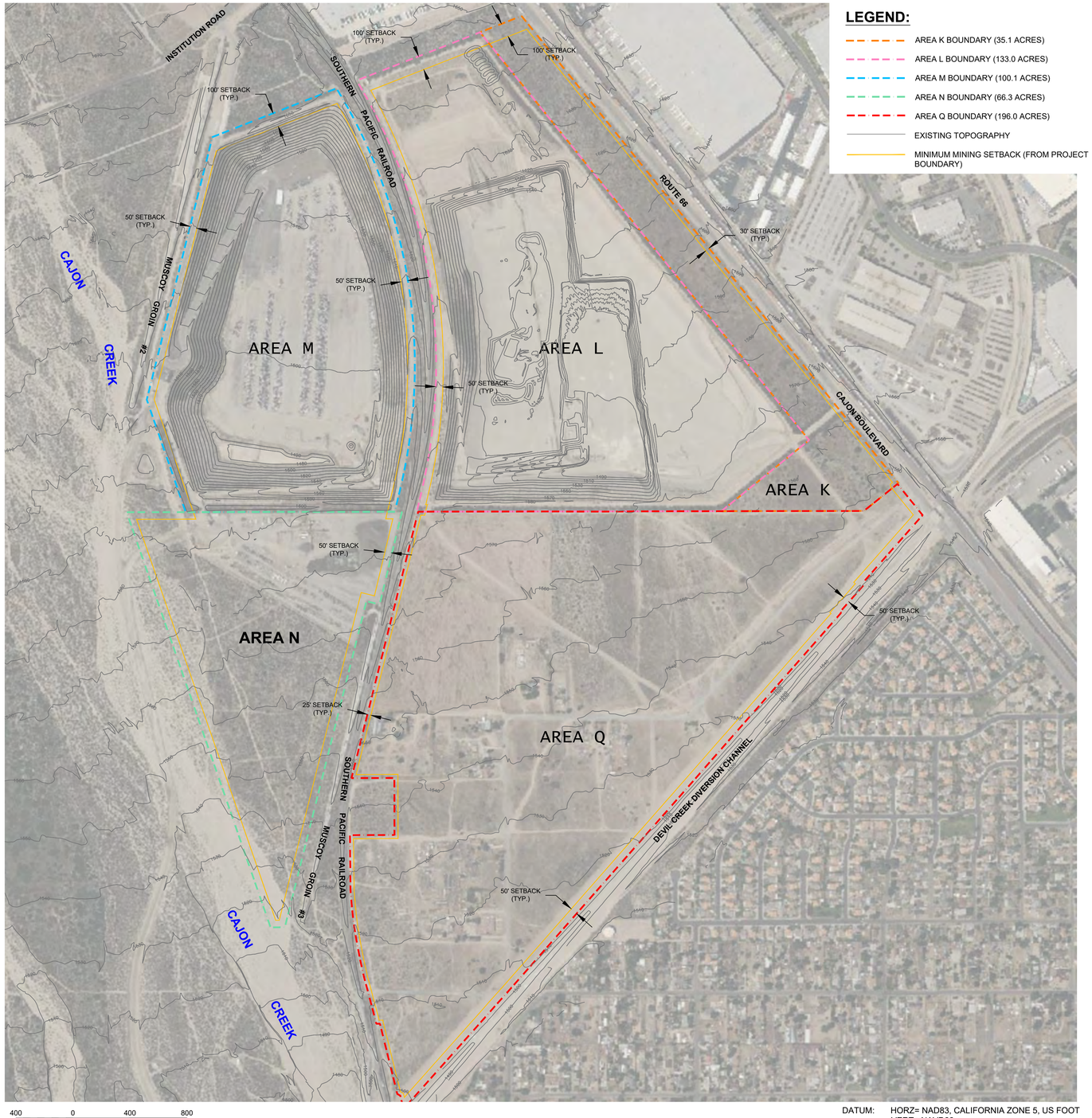
CONTOUR INTERVAL: 10 FEET

AERIAL:

BING IMAGERY, 2022

PROJECT SITE INFORMATION

EASEMENT:	PUBLIC UTILITIES EASEMENTS TO BE VACATED PRIOR TO MINING WITHIN THESE AREAS
MINERAL BEING EXTRACTED:	SAND AND GRAVEL
ADJACENT AREA:	SEE SHEET 3
PROJECT AREA:	SEE SHEET 3
PROTECTED PLANTS:	NONE
GROUNDWATER LEVEL:	+260 FEET BELOW GROUND SURFACE (SEE SHEET 5 AND 6)
EXISTING LAND USE DESIGNATION:	SEE TABLE SHEET 2
PROPOSED LAND USE DESIGNATION:	SEE TABLE SHEET 2
ELECTRICITY:	SOUTHERN CALIFORNIA EDISON (SCE) P.O. BOX 800 ROSEMEAD, CA 91770 (800) 655-4555
GAS:	N/A (NO NATURAL GAS AND/OR PROPANE SERVICE REQUIRED)
WATER:	EXISTING WATER WELL LOCATED WITHIN AREA M
SEWER:	EXISTING PORTABLE SANITATION FACILITIES LOCATED WITHIN AREA L
TELEPHONE:	N/A (NO FIXED LANDLINE TELEPHONE SERVICE REQUIRED)



Vulcan Materials Company

SESPE CONSULTING, INC.
A Trinity Consultants Company
374 Poli Street, Suite 200 • Ventura, CA 93001
(805) 275-1515 • www.sespeconsulting.com

OWNER / APPLICANT
VULCAN MATERIALS COMPANY -
WESTERN DIVISION
31 RANCHO CAMINO DRIVE, SUITE 300
POMONA, CALIFORNIA 91766

LAND USE CONSULTANT
SESPE CONSULTING, INC.
374 POLI STREET, SUITE 200
VENTURA, CALIFORNIA 93001
(805) 275-1515

REVISIONS

MARK	DATE	DESCRIPTION	BY
	12/20/22	INITIAL DRAFT	GJC

REVIEWED BY: DATE DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

SITE OVERVIEW - EXISTING CONDITIONS

SCALE: HORIZ. AS SHOWN VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER 1



INDEX MAP

GEOLOGIC DESCRIPTION:

THE GEOLOGIC DESCRIPTION IS BASED ON THE FOLLOWING TECHNICAL REPORTS AND HAS NOT BEEN VERIFIED IN THE FIELD BY THE UNDERSIGNED:

- DANSKIN, W., MCPHERSON, K., & WOOLFENDEN, L. (2006). *HYDROLOGY, DESCRIPTION OF COMPUTER MODELS, AND EVALUATION OF SELECTED WATER-MANAGEMENT ALTERNATIVES IN THE SAN BERNARDINO AREA, CALIFORNIA*. U.S. GEOLOGICAL SURVEY. U.S. GEOLOGICAL SURVEY.
- DUTCHER, L., & GARRETT, A. (1963). GEOLOGIC AND HYDROLOGIC FEATURES OF THE SAN BERNARDINO AREA, CALIFORNIA. WASHINGTON, D.C.: US GOVERNMENT PRINTING OFFICE.
- HALEY & ALDRICH, INC. (APRIL 2020). *ADDENDUM TO GEOTECHNICAL EVALUATION REPORT*. WALNUT CREEK, CA: HALEY & ALDRICH, INC.
- MILLER, F., & MATTI, J. (2001). GEOLOGIC MAP OF THE SAN BERNARDINO NORTH 7.5' QUADRANGLE, SAN BERNARDINO COUNTY , CALIFORNIA. *OPEN-FILE REPORT 01-131*. MENLO PARK, CA, SAN BERNARDINO: U.S. GEOLOGICAL SURVEY. RETRIEVED FROM HTTPS://PUBS.USGS.GOV/OF/2001/0131/.

GEOLOGIC SETTING

THE SITE IS LOCATED WITHIN THE PENINSULAR RANGES PHYSIOGRAPHIC PROVINCE, WHICH CONSISTS OF A SERIES OF MOUNTAINS RANGES DOMINATED BY MESOZOIC GRANITIC AND OLDER METAMORPHIC ROCKS SEPARATED BY VALLEY BASINS FORMED BY SAN ANDREAS-RELATED FAULTS AND OTHER FAULT SEGMENTS. THE SITE IS SITUATED WITHIN THE SAN BERNADINO BASIN, AN ALLUVIAL LOWLAND FILLED WITH SEDIMENT DERIVED FROM SURROUNDING HIGHLANDS THAT IS BOUND BY THE SAN ANDREAS FAULT ZONE TO THE NORTH AND THE SAN JACINTO FAULT TO THE SOUTHWEST. THE SAN BERNADINO BASIN REPRESENTS A PULL-APART BASIN THAT FORMED IN RESPONSE TO A RIGHT STEP DISPLACEMENT BETWEEN THE SAN JACINTO AND SAN ANDREAS FAULTS (HALEY & ALDRICH, 2020).

REGIONAL GEOLOGY

THE SITE IS SITUATED SOUTH OF THE EASTERN EXTENT OF THE SAN GABRIEL MOUNTAINS, A PROMINENT PHYSIOGRAPHIC FEATURE ALONG THE NORTHERN EDGE OF THE LOS ANGELES METROPOLITAN AREA AND PORTIONS OF THE INLAND EMPIRE. THE REGIONAL GEOLOGY CONSISTS OF SEDIMENTARY BASIN INFILL CHARACTERIZED AS UNCONSOLIDATED RIVER-CHANNEL DEPOSITS AND HOLOCENE AND PLEISTOCENE ALLUVIUM (DANSKIN, ET AL., 2006). THE EASTERN REGION IS CHARACTERIZED BY YOUNGER ALLUVIUM, AND QUATERNARY AND TERTIARY INDURATED SEDIMENTARY STRATA OUTCROPPING ALONG LOW-RELIEF HILLSIDES. A BASEMENT COMPLEX OF PRECAMBRIAN TO TERTIARY IGNEOUS AND METAMORPHIC ROCKS THAT UNDERLIES THE BASIN INFILL CROPS OUT IN THE SURROUNDING MOUNTAIN RANGES (DUTCHER & GARRETT, 1963). REGIONALLY, THE AREA IS CONSIDERED SEISMICALLY ACTIVE, WITH MANY FAULTS DESIGNATED AS BEING IN ALQUIST-PRIOLO (AP) SPECIAL STUDY ZONES. THE REGIONAL STRUCTURAL GEOLOGY IS CHARACTERIZED BY THE CUCAMONGA THRUST FAULT AND THE SAN ANDREAS FAULT, WHICH BOUND THE SAN GABRIEL MOUNTAINS TO THE SOUTH AND NORTHEAST, RESPECTIVELY. THE SAN JACINTO FAULT TRENDS BETWEEN THE CUCAMONGA THRUST FAULT AND THE SAN ANDREAS FAULT THROUGH LYTLE AND GLEN HELEN WASHES AND CANYONS.

SITE GEOLOGY

THE GEOLOGY OF THE SITE IS CHARACTERIZED AS BRAIDED, ALLUVIAL LITHOFACIES THAT FORM WITHIN MEDIAL TO DISTAL FAN COMPLEXES. BASED ON THE USGS GEOLOGIC MAP OF THE SAN BERNADINO NORTH 7.5-MINUTE QUADRANGLE, SAN BERNADINO COUNTY, CALIFORNIA (MILLER & MATTI, 2001), THREE DISTINCT ALLUVIAL LITHOFACIES ARE MAPPED AT THE SITE. THE NORTHEASTERN PORTION OF THE SITE IS CHARACTERIZED BY LATE HOLOCENE SAND AND GRAVEL DEPOSITS DISTINGUISHED AS UPPER-TERRACE LEVEL SEDIMENTARY DEPOSITS. THE LITHOFACIES OCCURRING IN THE CENTRAL SECTION OF THE SITE, AS WELL AS THE NORTHEASTERN PORTION, IS SLIGHTLY CONSOLIDATED TO CEMENTED HOLOCENE AND LATE PLEISTOCENE SILT, SAND, AND PEBBLE DEPOSITS. IN THE SOUTHWEST CORNER OF AREA Q, LATE HOLOCENE, LOWER TERRACE DEPOSITS OCCUR THAT CONSIST OF SAND AND GRAVEL WITH SPARSE PEBBLE TO BOULDER SIZE CLASTS. THESE DEPOSITS ARE TYPICALLY THIN (< 10 FT THICK) AND LATERALLY DISCONTINUOUS DUE TO LOCALIZED EROSION AND SCOURING. REGARDING STRUCTURAL GEOLOGY, THERE ARE THREE MAJOR FAULTS NEAR THE SITE: THE GLEN HELEN FAULT STRAND OF THE SAN JACINTO FAULT, THE CUCAMONGA THRUST FAULT, AND THE SAN ANDREAS FAULT (HALEY & ALDRICH, 2022). A PORTION OF THE GLEN HELEN FAULT STRAND, LIKELY THE MOST ACTIVE FAULT OF THE SAN JACINTO FAULT, IS MAPPED AS A "CONCEALED" FAULT TRENDING THROUGH THE SOUTHWEST PORTION OF AREA Q. THIS FAULT SEGMENT IS LISTED AS A STATE OF CALIFORNIA AP EARTHQUAKE FAULT ZONE.

GENERAL NOTES:

TERMINATION DATES

MINING:	2088
RECLAMATION:	2090
MONITORING:	2093

DESIGN INFORMATION

MINING DEPTH:	240 FEET BELOW GROUND SURFACE (BGS)
SLOPES:	2H:1V (HORIZONTAL TO VERTICAL)

STRUCTURES

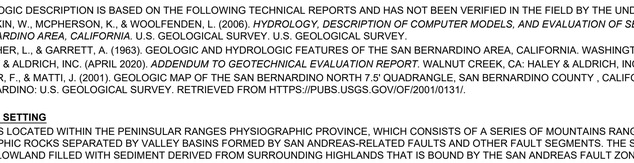
ADJACENT AREA: NO OFF-SITE ADJACENT STRUCTURES WITHIN 200 FEET OF SITE BOUNDARIES

PROJECT AREA: EXISTING AND PROPOSED STRUCTURES ARE IDENTIFIED ON SHEET 6, AND INCLUDE (BUT ARE NOT LIMITED TO): AGGREGATE PROCESSING PLANT, HOT MIX ASPHALT PLANT, RECYCLE PLANT, CONVEYORS, ANCILLARY SUPPORT FACILITIES. NO PERMANENT STRUCTURES PROPOSED, ALL STRUCTURES ARE TEMPORARY AND WILL BE REMOVED DURING RECLAMATION.

NO SIGNAGE PROPOSED.

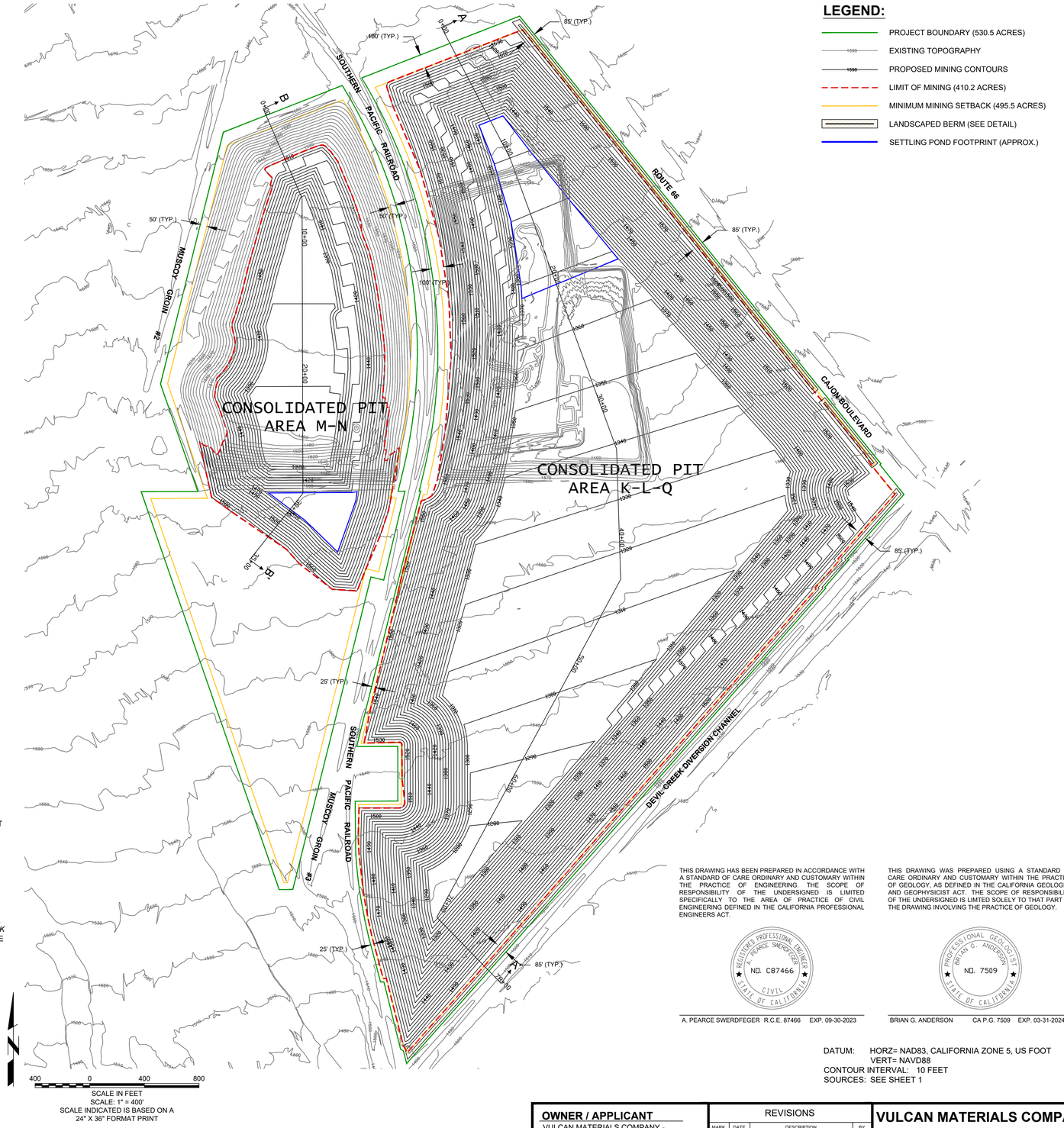
MINING NOTES:

1. MINING MAY BE CONDUCTED IN MULTIPLE AREAS THROUGHOUT THE SITE AT ONE TIME TO ALLOW THE OPERATOR TO BLEND MATERIALS FROM MULTIPLE AREAS TO MEET PRODUCT SPECIFICATIONS. THEREFORE, MINING IN THE VARIOUS EXTRACTION AREAS THROUGHOUT THE SITE IS CONSIDERED A SINGLE PHASE.
2. MOST OF THE TOPSOIL AND SUBSOIL HAVE ALREADY BEEN REMOVED FROM THE MINING AREAS. THIS MATERIAL WILL BE STORED IN PERIMETER BERMS IN AREA K AND Q, AS SHOWN. ANY ADDITIONAL MATERIAL RECOVERED DURING OPERATIONS WILL BE STORED FOR USE IN RECLAMATION.
3. MINING SETBACKS WILL BE MAINTAINED AS SHOWN HEREON.
4. THE OPERATOR WILL COMPLY WITH THE CONCLUSIONS PRESENTED BY HALEY & ALDRICH, INC. IN THE *GEOTECHNICAL EVALUATION FOR VULCAN MATERIALS COMPANY CAJON CREEK CONSOLIDATION PROJECT* (REPORT DATE: OCTOBER 10, 2022). FINAL PIT SLOPES SHALL BE INCLINED NO STEEPER THAN 2H:1V.
5. BEST MANAGEMENT PRACTICES (BMPs) TO PREVENT EROSION, SEDIMENT, AND WINDBLOWN DUST WILL BE IMPLEMENTED AS DESCRIBED IN THE SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP).
6. APPROXIMATE ANTICIPATED LOCATION OF FINES SETTLING BASINS ARE SHOWN HEREON FOR ILLUSTRATIVE PURPOSES AND ARE SUBJECT TO CHANGE IN VOLUME, LOCATION, AND FOOTPRINT BASED ON OPERATIONAL NEEDS OVER THE LIFE OF THE MINE.



BERM DETAIL

N.T.S.
DETAIL FOR PERIMETER BERM IN AREA K AND Q



LEGEND:

- PROJECT BOUNDARY (530.5 ACRES)
- EXISTING TOPOGRAPHY
- PROPOSED MINING CONTOURS
- LIMIT OF MINING (410.2 ACRES)
- MINIMUM MINING SETBACK (495.5 ACRES)
- LANDSCAPED BERM (SEE DETAIL)
- SETTLING POND FOOTPRINT (APPROX.)

THIS DRAWING HAS BEEN PREPARED IN ACCORDANCE WITH A STANDARD OF CARE ORDINARY AND CUSTOMARY WITHIN THE PRACTICE OF ENGINEERING. THE SCOPE OF RESPONSIBILITY OF THE UNDERSIGNED IS LIMITED SPECIFICALLY TO THE AREA OF PRACTICE OF CIVIL ENGINEERING DEFINED IN THE CALIFORNIA PROFESSIONAL ENGINEERS ACT.

REGISTERED PROFESSIONAL ENGINEER — A. PEARCE SWERDFEGER — NO. C87466 — CIVIL — STATE OF CALIFORNIA

A. PEARCE SWERDFEGER R.C.E. 87466 EXP. 09-30-2023

THIS DRAWING WAS PREPARED USING A STANDARD OF CARE ORDINARY AND CUSTOMARY WITHIN THE PRACTICE OF GEOLOGY, AS DEFINED IN THE CALIFORNIA GEOLOGIST AND GEOPHYSICIST ACT. THE SCOPE OF RESPONSIBILITY OF THE UNDERSIGNED IS LIMITED SOLELY TO THAT PART OF THE DRAWING INVOLVING THE PRACTICE OF GEOLOGY.

PROFESSIONAL GEOLOGIST — BRIAN G. ANDERSON — NO. 7509 — STATE OF CALIFORNIA

BRIAN G. ANDERSON CA P.G. 7509 EXP. 03-31-2024

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88
CONTOUR INTERVAL: 10 FEET
SOURCES: SEE SHEET 1

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REVISIONS

MARK	DATE	DESCRIPTION	BY
	12/20/22	INITIAL DRAFT	GJC

REVIEWED BY: _____ DATE _____
_____ DATE _____

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

MINING PLAN

SCALE: HORZ. AS SHOWN VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER 2

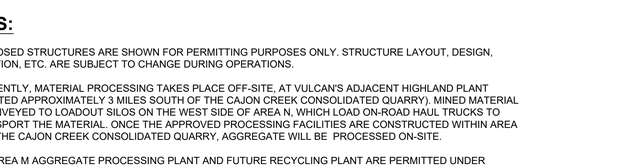
Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\CAD\Consolidated Mine & Rec Plan\Vulcan–CajonCreek–ConsolidatedMP–v1.0.dwg Jun 12, 2023, 4:01pm Pearce.Swerdfeger



INDEX MAP

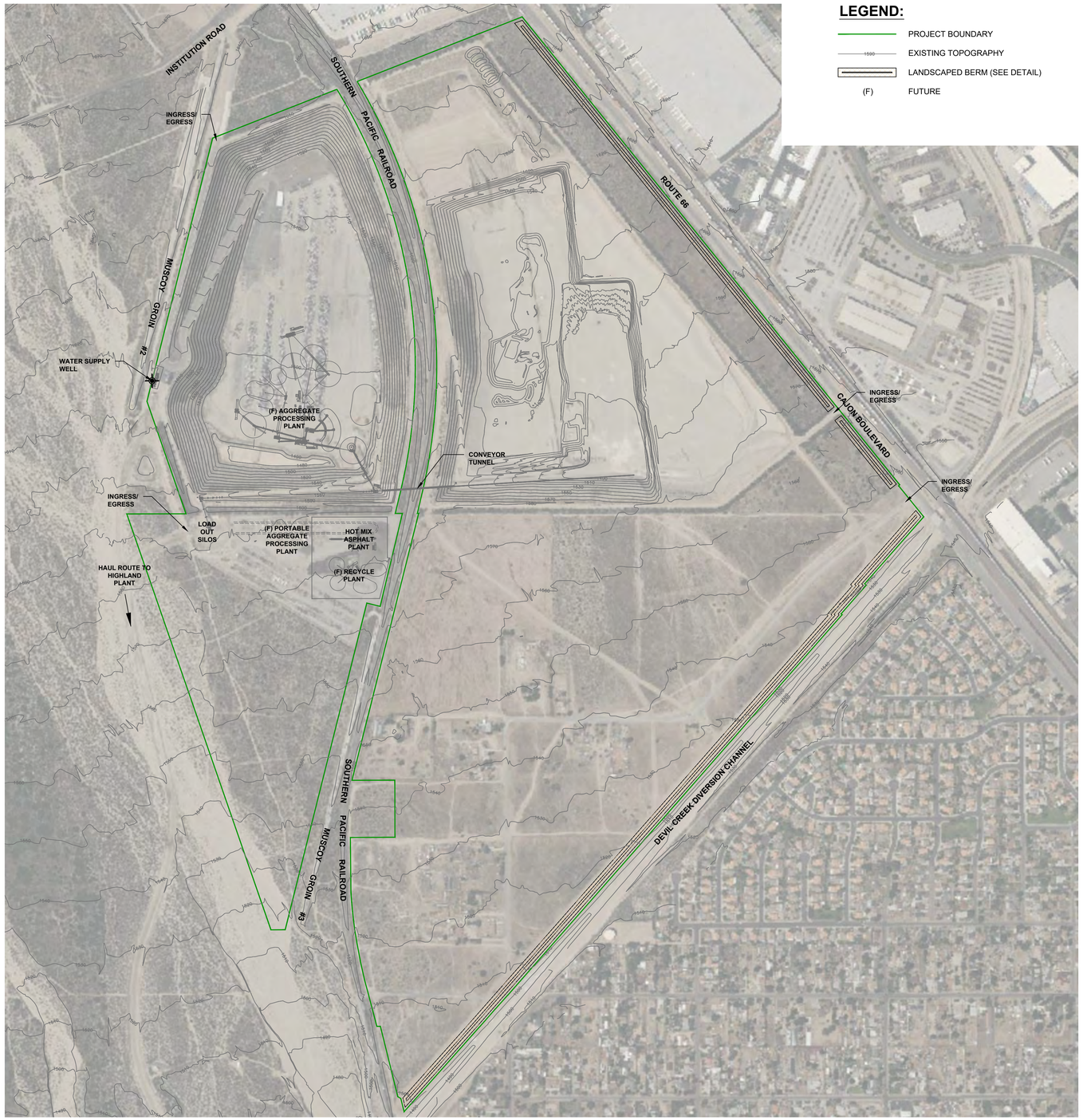
NOTES:

1. PROPOSED STRUCTURES ARE SHOWN FOR PERMITTING PURPOSES ONLY. STRUCTURE LAYOUT, DESIGN, LOCATION, ETC. ARE SUBJECT TO CHANGE DURING OPERATIONS.
2. CURRENTLY, MATERIAL PROCESSING TAKES PLACE OFF-SITE, AT VULCAN'S ADJACENT HIGHLAND PLANT (LOCATED APPROXIMATELY 3 MILES SOUTH OF THE CAJON CREEK CONSOLIDATED QUARRY). MINED MATERIAL IS CONVEYED TO LOADOUT SILOS ON THE WEST SIDE OF AREA N, WHICH LOAD ON-ROAD HAUL TRUCKS TO TRANSPORT THE MATERIAL. ONCE THE APPROVED PROCESSING FACILITIES ARE CONSTRUCTED WITHIN AREA M OF THE CAJON CREEK CONSOLIDATED QUARRY, AGGREGATE WILL BE PROCESSED ON-SITE.
3. THE AREA M AGGREGATE PROCESSING PLANT AND FUTURE RECYCLING PLANT ARE PERMITTED UNDER CONDITIONAL USE PERMIT (CUP) 91-31, SPECIFIC PLAN SP NO. 90-01, AND DEVELOPMENT PERMIT 97-24. THE EXACT LOCATION OF THE RECYCLE PLANT WITHIN AREA M OR L HAS NOT BEEN DETERMINED AT THIS TIME, AND IS THEREFORE NOT SHOWN ON THE SITE PLAN.
4. AT THE CESSATION OF MINING IN AREAS K, L, AND Q, A PORTABLE PROCESSING PLANT WILL BE INSTALLED IN THE AREA N PIT SO THAT THE MATERIAL FROM BENEATH THE CURRENT PROCESSING PLANT(S) IN AREA M CAN BE EXTRACTED AND PROCESSED.
5. AREA N HOT MIX ASPHALT PLANT PERMITTED UNDER DEVELOPMENT PERMIT MM 22-08.



BERM DETAIL

N.T.S.
DETAIL FOR PERIMETER BERM IN AREA K AND Q



LEGEND:

- PROJECT BOUNDARY
- 1590 EXISTING TOPOGRAPHY
- LANDSCAPED BERM (SEE DETAIL)
- (F) FUTURE

N

400 0 400 800

SCALE IN FEET
SCALE: 1" = 400'
SCALE INDICATED IS BASED ON A
24" X 36" FORMAT PRINT

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88
CONTOUR INTERVAL: 10 FEET
SOURCES: SEE SHEET 1

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REVISIONS

MARK	DATE	DESCRIPTION	BY
	12/20/22	INITIAL DRAFT	GJC

REVIEWED BY:
DATE
DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

SITE LAYOUT PLAN

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER 3

Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\CAD\Consolidated Mine & Rec Plan\Vulcan–CajonCreek–ConsolidatedMP–v1.0.dwg Jun 12, 2023, 4:01pm Pearce.Swerdfeger

APPENDIX B

Cajon Creek Consolidation Project – Health Risk Assessment
(Sespe Consulting, 2023)

SESPE CONSULTING, INC.
A Trinity Consultants Company
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HEALTH RISK ASSESSMENT
VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATION PROJECT

County of San Bernardino, CA

June 6, 2023

Prepared for:
Vulcan Materials Company, Western Division

SESPE CONSULTING, INC.
A Trinity Consultants Company
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Health Risk Assessment
Vulcan Materials Company
Cajon Creek Consolidation Project
June 6, 2023

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Health Risk Assessment
Vulcan Materials Cajon Creek Consolidation Project
June 6, 2023

1.0 INTRODUCTION

This Health Risk Assessment (Report) has been prepared to quantify and assess the potential significance of health risk impacts associated with the proposed Cajon Creek Consolidation Project (Project).

Vulcan Materials Company – Western Division (Vulcan) operates two separate and adjacent surface mining and processing operations in the City and County of San Bernardino. The existing Cajon Creek Quarry is located in the City of San Bernardino (City). The existing Area Q Quarry is located in the County of San Bernardino (County). The Cajon Creek Quarry was initially approved by the City in 1993 as part of the CalMat Cajon Creek Specific Plan (SP No. 90-01, et al.), and analyzed within an Environmental Impact Report (EIR) published in the same year. In 2020, the County approved the Area Q Quarry, which was evaluated within a separate EIR certified by the County in 2020. Health risk assessments were prepared for the 1993 and 2020 EIRs. Figures 1a and 1b (Appendix A) outline the extents of the existing quarries and the names of each area within the quarries.

The Cajon Creek Consolidation Project (Project) would consolidate the Cajon Creek Quarry (which is divided into Planning Areas K, L, M, and N) and the Area Q Quarry into one surface mining operation under a single Reclamation Plan. More specifically, the Project would amend the Cajon Creek Specific Plan to authorize mineral resource recovery within Planning Area K and on a portion of Planning Area N, increase mining depth in Planning Areas L and M from 120-feet to 240-feet below ground surface (bgs), and permit daylighting of the resource between Planning Areas M and N and between Planning Areas K and L and the Area Q Quarry. The Project would amend the Mining Plan and Reclamation Plan for the Area Q Quarry to increase mining depth from 120-feet to 240-feet and allow daylighting between the Area Q Quarry and Areas K and L. Because the Project calls for mining activities in two new areas not previously evaluated in 1993 or 2020, specifically Area K and Area N, this health risk assessment has been prepared to determine whether the change in location of mining activities would expose any sensitive receptors to substantial pollutant concentrations.

Current entitlements include mining in Area Q at the rates proposed for Areas K and N (Table 1). Mining in Area Q is not part of this Project. This HRA was performed to analyze the difference between operating in Area Q and each of the additional areas (K and N). There would not be concurrent mining in Area Q and either, or both, Area K or N. Thus, emissions were modeled to be moved from Area Q (sink with negative emissions values representing sources going away) to Areas K and N (sources with positive emissions values representing new locations of sources). Depending upon the location of a receptor, the health risk may decrease with implementation of the Project. For instance, because Area Q lies between the Project Areas (K and N) and residences located south of Area Q, the health risk at those residences during operations at Areas K and N would be less than the health risk from operating in Area Q.

Table 1 Project Activities

Activity	Annual Throughput	Hourly Throughput	Health Risk Model Status
Aggregates Mining	3,134,709 tons	2,772 tons	Additional locations in Areas K and N.

2.0 RISK ASSESMENT

The four steps involved in the risk assessment process are: 1) hazard identification, 2) exposure assessment, 3) dose-response assessment, and 4) risk characterization. These four steps were used to assess health risk for this HRA.

2.1 Hazard Identification

For air toxics sources, hazard identification involves the pollutant(s) of concern emitted by a facility, and the types of adverse health effects associated with exposure to the chemical(s), including whether a pollutant is a potential human carcinogen or is associated with other types of adverse health effects. Appendix E contains the toxic air contaminants (TACs) identified for health risk assessment in this Report.

Diesel particulate matter (DPM) is the surrogate TAC emitted by off-road engines, as it represents the risk from a mixture of TACs that constitute exhaust. DPM has an assigned cancer potency factor (CPF) and a non-cancer reference exposure level (REL) that are used to evaluate the health risk.

Fugitive dust is generally inert but does contain trace metals and respirable crystalline silica (RCS). The California Air Resources Board (CARB) maintains chemical speciation and size profiles for various sources of particulate matter. These speciations are conservative, as they serve to estimate TAC levels in soil for which site specific data is not available. Emissions speciations from the San Diego Air Pollution Control District were also used in this Report, in cases where up to date speciations were not maintained by CARB or the South Coast Air Quality Management District (SCAQMD). Details on speciation data can be found in Appendix E.

The health risk assessment (HRA) considered whether health risk from asbestos should be quantified. It was determined based on review of available maps (California Department of Conservation, Division of Mines and Geology, 2000) and language in the Asbestos ATCM's (17CCR §93105 and §93106), which allow the APCO to exempt sand and gravel facilities operating in alluvial deposits, which is the condition on the Project site. Therefore, asbestos was excluded from the HRA.

2.2 Exposure Assessment

Exposure assessment methodologies are presented below. Environmental fate and transport modeling of the emissions are combined with pathway data to determine health risk at receptor locations.

2.2.1 Emission Quantification

This assessment incorporates the following general assumptions in the quantification of emissions:

- The excavation and associated equipment would operate in compliance with applicable air quality regulations.
    - Diesel engines would comply with applicable state regulations (i.e., ATCM). This includes labeling of off-road equipment with registration numbers assigned by CARB, establishment of an idling policy, and limiting idle time to less than five minutes (13 CCR §2449).
    - Fugitive dust emissions would be controlled through implementation of the controls and compliance with performance measures in Rules 403 and 1157.
- The Project is located in San Bernardino County, which is among the counties that are unlikely to contain serpentine and ultramafic rock (OPR, 2000). No serpentine or ultramafic rock has been found on the Project site or in the vicinity of the Project. The Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR § 93105) allows the APCO from the local air district to exempt materials produced by facilities that mine alluvial deposits as would be the case for the Project. Therefore, asbestos was excluded from HRA performed for the Project.
- Hazardous substances or acutely hazardous substances would be present in quantities that would be less than those subject to chemical accident prevention provisions of the CAA or the implementing regulation (40 CFR Part 68).

The following assumptions are design features of the Project:

- Excavation/production rate of aggregates and equipment used to excavate would remain unchanged from other existing areas.
- Emissions characteristics of off-road vehicle engines reflect the fleet currently operating on-site. Future year fleets considered in the cancer risk assessment incorporate engine turnover as required by the In-Use Off-road Engine ATCM for a large fleet operator.

Emissions Calculations Methodologies

Emissions from combustion sources associated with the Project primarily consist of non-road diesel engines in off-road vehicles. The water truck is assumed to have an off-road engine for purposes of this analysis instead of an on-road engine that emits less pollutants as compared to an off-road engine that was manufactured in the same calendar year (i.e., an on road 2010 model year engine is cleaner than a 2010 off-road engine). Emissions from dust sources associated with the Project include dozer/quarrying and aggregates handling emissions. Emissions are calculated in Appendix E using the methods presented below.

Non-Road Engines Emissions

Non-road engine hours from off-road vehicles were calculated based on historical fuel consumption records from the Area Q Environmental Impact Report (See Appendix B and Appendix E) which were converted into horse power hours based on the 0.367 lb fuel/hp-hr from the California Air Resources Board OFFROAD Model. Engine specific emissions factors were based on engine tier. Project and baseline emissions were both conservatively assumed to utilize tier 4i engines. Engine emissions rates decrease over time as the fleet is turned over and controls are implemented to comply with CARB regulations (i.e., In-Use Off-Road). Appendix A of the CalEEMod User Manual contains the following equation for quantifying off-road engine emissions.

$$Emissions_{DieselEx} = \sum_{i} (EF_i \times Pop_i \times AvgHP_i \times Load_i \times Activity_i)$$

Where:

EF = Emission factor (g/bhp-hr)
Pop = Population, or the number of pieces of equipment.
AvgHP = Maximum rated average horsepower.
Load = Load factor.
Activity = Hours of operation.
i = Equipment type.

Table 2 summarizes the Baseline and Project Fleet. Project emissions were determined by calculating emissions using activity levels based on Baseline fuel use (Appendix E).

Table 2 Off-road Equipment

Phases	Vehicle	Horsepower (avg)	Load Factor
Baseline and Project	Loaders	900	0.36
	Water Trucks	537	0.38
	Dozers	410	0.43
	Graders	240	0.41

Source: Appendix E

Bulldozing/Quarrying

Bulldozing emissions were calculated using the method in Appendix C of the CalEEMod User's Guide. Silt content of 6.9% was assumed which is the CalEEMod default. Baseline dozer operation was assumed based on historical fuel use (Appendix E.13). Baseline control efficiency of 74% is assumed for watering.

$$EF_{PM10}\left(\frac{lb}{hr}\right) = \frac{s^{1.5}}{7.9^{1.4}} \times 0.75 \times (1 - 0.74) = \mathbf{0.20\ lb/hr}$$

$$EF_{PM10}\left(\frac{lb}{hr}\right) = \frac{s^{1.2}}{7.9^{1.3}} \times 0.105 \times (1 - 0.74) = \mathbf{0.11\ lb/hr}$$

Where: s = silt content (%)

Aggregates Handling

Each time materials are handled, dust emissions are generated. Specifically, the following emissions factor equation from AP-42 Section 13.2.4 demonstrates the PM_{10} emissions, while the PM2.5 emission factor was assumed to be 29.2% of PM10 based on SCAQMD's Updated CEIDARS.

$$EF\ PM10 = k(0.0032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} = \mathbf{0.00062\ lb/ton}$$

$$EF\ PM2.5 = (EF\ PM10)0.292 = \mathbf{0.00018\ lb/ton}$$

Where: EF = emission factor (lb/ton).
k = particle size multiplier (dimensionless: 0.35 for PM_{10}).
U = mean wind speed, (miles per hour [mph]) Mean wind speed based on data for San Bernardino (South Coast) in Table 1 of CalEEMod User Manual Appendix D which states 2.2 m/s (5 mph).
M = material moisture content (%). Assumed to be 3%.

2.2.2 Modeling of Environmental Transport & Evaluation of Environmental Fate

Specific information regarding the modeling process used in this HRA is presented below.

Dispersion Modeling

In this HRA, the air dispersion modeling was performed using AERMOD View by Lakes Environmental (Version 11.2.0 running AERMOD executable Version 21112). The HARP2 ADMRT Risk Module (Version 22118) was used to generate risk plot files and determine health impacts at receptors using Health Database version 23118.

The Control Pathway of AERMOD was set to provide output in units of concentration; and both wet and dry plume depletion were disabled, even though depletion does occur, resulting in a conservative overestimation of ground level concentrations (GLCs). Terrain Options within AERMOD were set to "Flat & Elevated" and digital terrain files were downloaded through AERMOD from the National Elevation Database in geotiff format "NED GEOTIFF". Averaging options were set to 1-hour and the period of the meteorological data file (i.e., five years) as provided by SCAQMD. The ADJ_U* setting was used pursuant to current EPA Guidelines in Appendix W of 40 CFR Part 51 (82 FR 5182, 1/17/2017), and as included in the AQMD meteorological file. The urban dispersion coefficient was used, which is the default for SCAQMD. Algorithms to include deposition, exponential decay and low wind (beta) were omitted.

4,359 nested grid receptors, 220 fence-line receptors, 441 cartesian grid receptors, and 53 discrete Cartesian receptors were modeled at ground level. The receptors, sources that existed in the Baseline, and sources proposed by the Project are illustrated in Appendix A. Additionally, receptors of high concern that are identified in Figure 4 were determined to be effectively considered by existing receptors. Source parameters are summarized in Table 4.

Output of the dispersion model in the form of plot files, one for each combination of source and averaging period, containing X/Q values, which were processed along with an emissions inventory in the HARP2 ADMRT to determine risk. Exposure parameters discussed below were compiled into the HRACalc.exe input file (HRAInput.hra) used with GLC plot files, exposure parameters, and unit risk values to predict the cancer and non-cancer risks at each receptor. Electronic Modeling files are provided in Appendix G.

Table 3 Representative Discrete Receptors

ID Number	Description	UTM Coordinate (meters E)	UTM Coordinate (meters N)
418	Residence	467613.4	3781428
426	Worker	466309.5	3782601
421	Worker	467382.5	3781967
1073	Vermont Elementary School	467500	3780210
2330	Fundamentals Preschool Academy	468500	3782460
3983	Facility Fence Line	467388.3	3781773
4083	Facility Fence Line	465973.7	3781689

Note: Project is in UTM Zone 11N.
Discrete cartesian receptors 375 – 427 in the modeling files are represented by receptors labeled 1 – 53 in Figure 5.

Table 4 Model Source Object Parameters

Source Type	Source ID	Source Description
VOLUME	KMINE	Quarrying Emissions, Dozer and Material Handling In Area K
VOLUME	NMINE	Quarrying Emissions, Dozer and Material Handling In Area N
VOLUME	KQSNK	Negative emissions sink for Area K model, representing removal of Area Q quarrying emissions
VOLUME	NQSNK	Negative emissions sink for Area N model, representing removal of Area Q quarrying emissions

Source IDs represent the name assigned to each source in the AERMOD model.

After emissions exit the source, the substances are dispersed in the air. In addition to being inhaled, particulates deposit on vegetation, on soil, and in water at a rate that is dependent on the particle size. A deposition rate of 0.05 m/s for emission sources that have controls is conservative and was used for the Project HRA.

2.2.3 Identification of Exposure Routes and Exposed Populations, Estimation of Exposure Levels

Substances and Exposure Routes

Multi-pathway substances have the potential to impact human health through inhalation and other exposure routes. For example, if deposition affected water or soil is ingested or comes in contact with skin, then it will contribute to the health risk. In addition to inhalation, soil ingestion, dermal, and mother's milk, pathways were enabled. Default settings were applied in exposure routes.

Exposed Populations

Discrete receptors were determined by aerial photo review. These receptors represent building centroids and are supported by receptor grids for the determination of maximum exposure locations. Offsite grid receptors are considered to be potential worker receptors if they are located in a place where it is reasonably foreseeable that an individual would work 8 hours each weekday for a year.

2.2.4 Estimation of Exposure Levels

AERMOD output files were used with HARP2 ADMRT software (version 22118) and standard practices to determine exposure levels. Because the plant was modeled as operating 16 hours per day, from 6am to 10pm, and 6 days per week, a worker adjustment factor (WAF) of 1.75 was applied. A fraction of time at residence was not applied to age bins less than 16 years. A fraction of time at home (FAH) was applied to bins above 16 years.

2.3 Dose-Response Assessment

The HARP2 software summarizes the health values that were used in the dose-response assessment in output files (Appendix G). The actual threshold for health effects in the general population is estimated; toxicology supporting the health risk values is extrapolated based on animal testing. Uncertainty factors are applied to the Lowest Observed Adverse Effects Level (LOAEL) or No Observed Adverse Effects Level (NOAEL) or Benchmark Concentration values from animal or human studies to help ensure that the chronic, 8-hour and acute REL values are less than the threshold for human health for nearly all individuals.

2.4 Risk Characterization

Impact Analysis

Determination of whether project emissions would expose receptors to substantial pollutant concentrations is a function of assessing potential health risks. Sensitive receptors are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors. When evaluating whether a project has the potential to result in localized impacts, the nature of the air pollutant emissions, the proximity between the emitting facility and sensitive receptors, the direction of prevailing winds, and local topography must be considered.

A Health Risk Assessment was performed to evaluate the effects of TACs including DPM from vehicle engines and various substances found in fugitive dust emissions (i.e., metals and respirable crystalline silica). Health risks associated with the Project are presented in Table 5 and Table 6 which show impacts would remain less than significant for Areas K and N respectively. As demonstrated below, there would be no new or more significant health risk impacts from the Project compared to those addressed in the 1993 EIR and 2020 EIR.

Table 5 Health Risk Impacts – Area K Quarrying

Model Receptor #	Figure Receptor #	Receptor Type	**Cancer Cases per Million People Exposed**	**Max Chronic Hazard Index**	**8 Hour Chronic Hazard Index**	**Max Acute Hazard Index**
378	40	Residential MEIR Cancer/Chronic/Acute	< 0	0	0	<0.001
420	46	Worker MEIW Cancer/Chronic/Acute	0.45	0.034	0.034	0.0032
1073	N/A	Vermont Elementary School	<0	0	0	0
2330	N/A	Fundamentals Preschool Academy	0.09	0.002	0.002	0
3985	N/A	PMI - Acute	N/A	N/A	N/A	0.04
Significance Threshold			**10**	**1.0**	**1.0**	**1.0**
Exceeds Threshold?			**No**	**No**	**No**	**No**

Source: Appendix F

The maximum hour lead concentration occurs at UTM Zone 11, Coordinate (467449.4, 3781696) and is 0.012 µg/m^3. The California 30 day average ambient air quality standard for lead is 1.5 µg/m^3.

Note: See notes for Tables 5 and 6 below Table 6.

Table 6 Health Risk Impacts – Area N Quarrying

Model Receptor #	Figure Receptor #	Receptor Type	**Cancer Cases per Million People Exposed**	**Max Chronic Hazard Index**	**8 Hour Chronic Hazard Index**	**Max Acute Hazard Index**
418	44	Residential MEIR Cancer/Chronic/Acute	< 0	0	0	0
426	46	Worker MEIW Cancer/Chronic/Acute	0.02	0.002	0.002	0.001
1073	N/A	Vermont Elementary School	<0	0	0	0
2330	N/A	Fundamentals Preschool Academy	<0	0	0	0
4073	N/A	PMI - Acute	N/A	N/A	N/A	0.02
Significance Threshold			**10**	**1.0**	**1.0**	**1.0**
Exceeds Threshold?			**No**	**No**		**No**

Source: Appendix F

The maximum hour lead concentration occurs at UTM Zone 11, Coordinate (465962.8 m E, 3781277 m N) and is 0.0078 µg/m^3. The California 30 day average ambient air quality standard for lead is 1.5 µg/m^3.

Note Tables 5 & 6

Tables provides results for representative receptors analyzed, however no off-site receptors in the model demonstrated significant Cancer, Chronic, or Acute risk. Results for residential and worker receptors can be found in Appendix F. PMIs for acute health risk occur at the following locations:

Area K - UTM Zone 11 coordinate (467449.4 m E, 3781696.23 m N)

Area N - UTM Zone 11 coordinate (465962.75 m E, 3781276.76 m N)

Community wide cancer risk calculations were determined to be unnecessary, as no residences are within the 1 in one million 70 year cancer risk isopleth (See Figures 7a & 7b)

Values of zero in the tables above indicate no risk associated with moving the quarrying operation location.

Values of <0 in the tables above means that the Project would result in a decrease of health risk to the receptor.

8 Hour Chronic Hazard Index conservatively assumed to be the same as the maximum chronic hazard index.

APPENDEIX A FIGURES

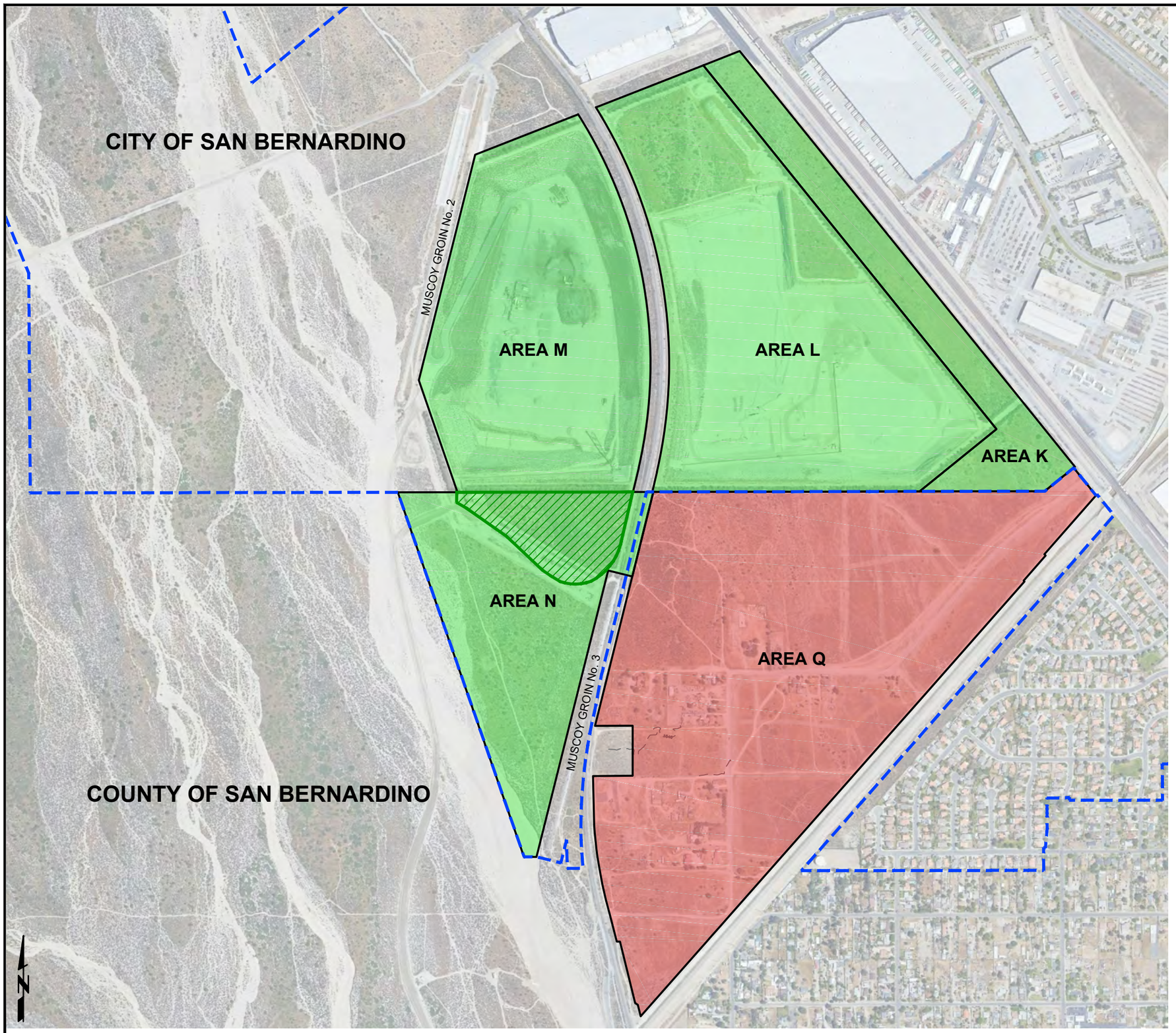
Figure 1a. Site Location (regional)
Figure 1b. Site Location (project areas)
Figure 2. Sensitive Receptor Locations
Figure 3. Wind Rose
Figure 4a. Sensitive Receptors Overview
Figure 4b. Sensitive Receptors Local
Figure 5. Modeled Source Objects and Receptors
Figure 6a. Area K Residential Cancer Risk Isopleth
Figure 6b. Area N Residential Cancer Risk Isopleth
Figure 7a. Area K Cancer Burden Isopleth
Figure 7b. Area N Cancer Burden Isopleth



Source: Google Earth 2018

SESPE CONSULTING, INC.

FIGURE	Site Location (regional)		
1	Cajon Creek Quarry Project Vulcan Materials Company San Bernardino County, California		
PROJECT #:	210509.0336	DATE:	11/2/22
SCALE:	SHOWN	DRAWN BY:	ADA



LEGEND

- CITY LIMITS BOUNDARY
- MINING AREAS IN THE CITY OF SAN BERNARDINO
- MINING AREA IN THE COUNTY OF SAN BERNARDINO

DATUM: HORZ= NAD83, CALIFORNIA ZONE
AERIAL: GOOGLE EARTH, DATED: 03/23/2019

SESPE CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
(805) 275-1515 • www.sespeconsulting.com

VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY
AREAS WITHIN CITY OR COUNTY OF SAN BERNARDINO

SCALE: HORIZ: AS SHOWN
VERT: AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BA
DATE: JANUARY 2021

FIGURE 1b

S:\Vulcan\Area Q\Figures\CAD\2021\Vulcan-Area-Q_Figure-1_01-21-21.dwg Jan 21, 2021, 3:48pm GJC



SESPE CONSULTING, INC.

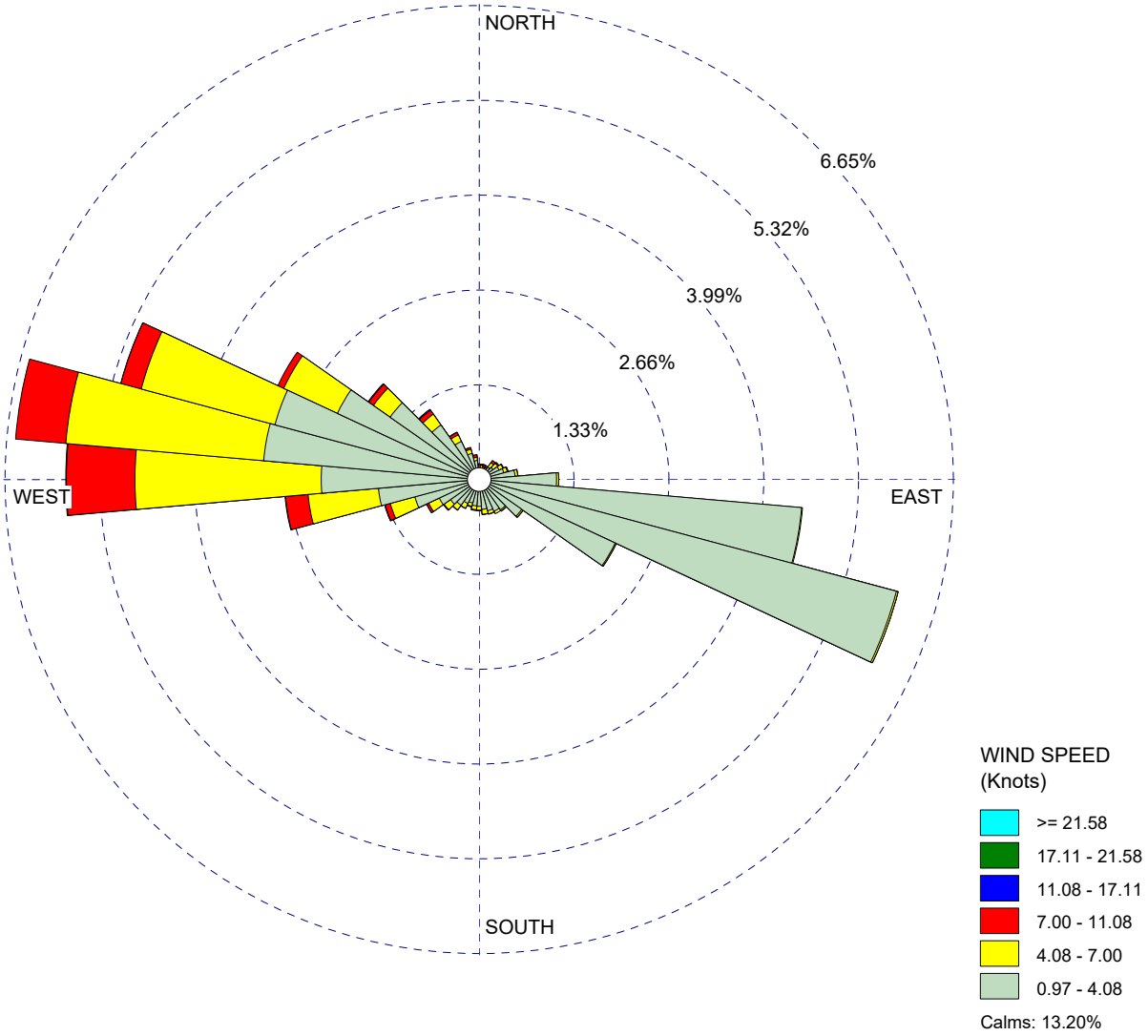
FIGURE 2	Sensitive Receptor Locations Cajon Creek Quarry Project Vulcan Materials Company San Bernardino County, California		
PROJECT #:	210509.0336	DATE:	11/2/22
SCALE:	SHOWN	DRAWN BY:	ADA

WIND ROSE PLOT:

Vulcan Cajon Creek Quarry Project

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

Meteorological data avaliable from the South Coast Air Quality Managment District.

http://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/aermod-table-1

DATA PERIOD:

Start Date: 1/1/2012 - 00:00
End Date: 12/31/2016 - 23:59

CALM WINDS:

13.20%

AVG. WIND SPEED:

2.57 Knots

COMPANY NAME:

Sespe Consulting

MODELER:

ADA

TOTAL COUNT:

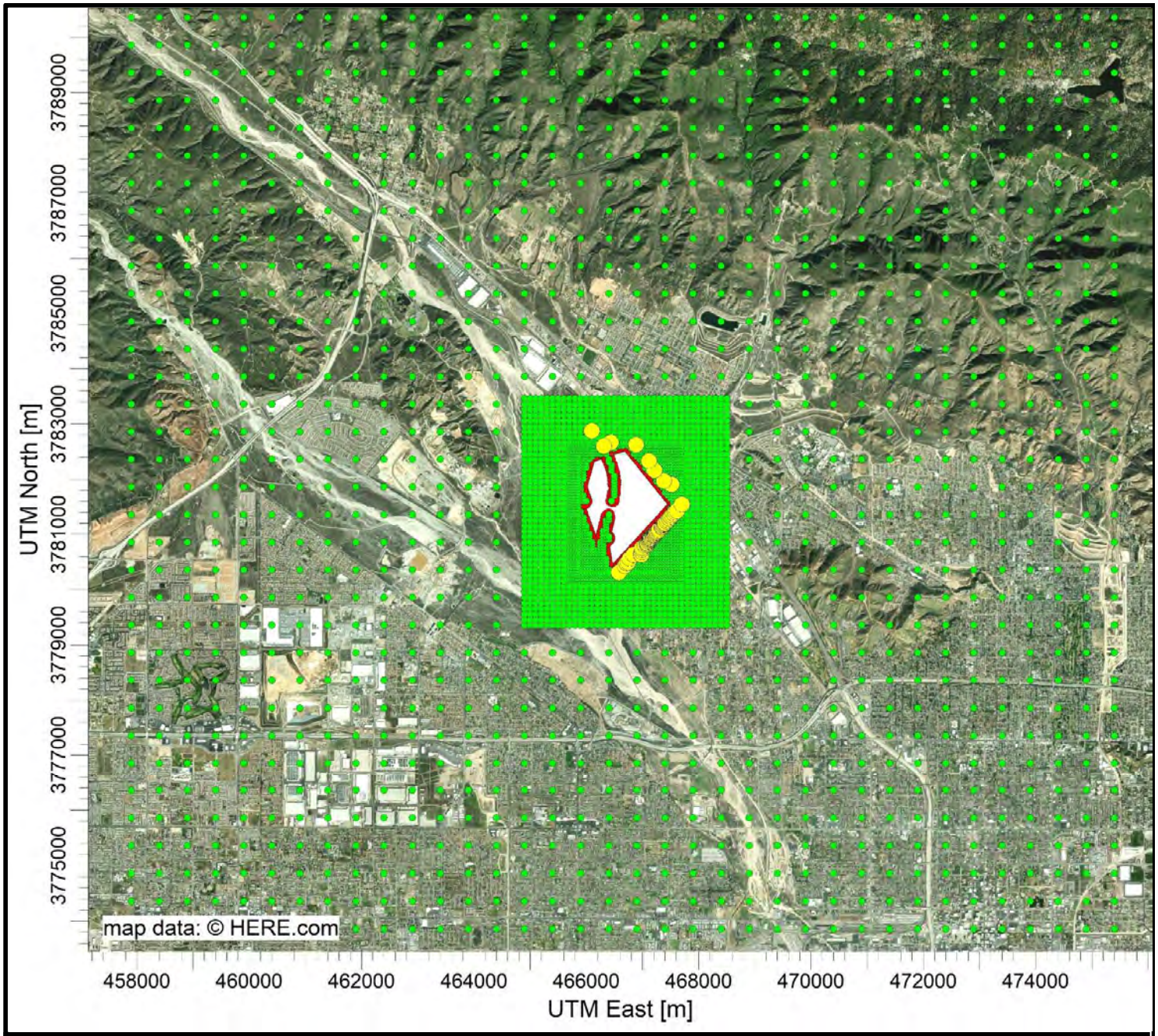
85370 hrs.

DATE:

11/3/2022

PROJECT NO.:

210509.0336



Modeled Nested Receptors (Green)

Modeled Fencline Receptors (Red)

Modeled Discrete Receptors (Yellow)

SESPE CONSULTING, INC.

FIGURE

4a

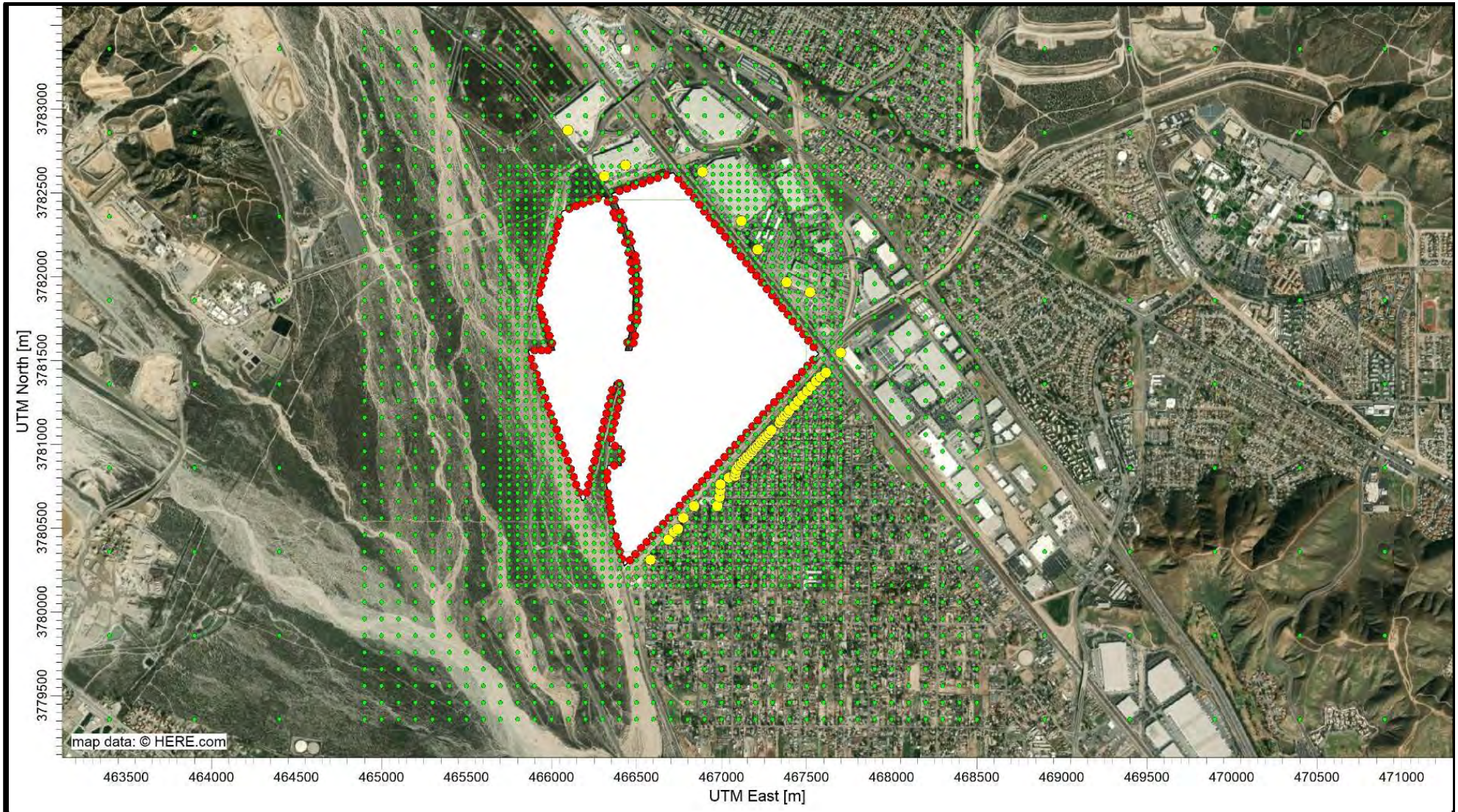
Model Receptor Locations Overview

Cajon Creek Quarry Project

Vulcan Materials Company

San Bernardino County, California

PROJECT #:	210509.0336	DATE:	11/2/22
SCALE:	SHOWN	DRAWN BY:	ADA



Modeled Nested Receptors (Green)

Modeled Fencline Receptors (Red)

Modeled Discrete Receptors (Yellow)

SESPE CONSULTING, INC.

FIGURE

4b

Model Receptor Locations

Cajon Creek Quarry Project

Vulcan Materials Company

San Bernardino County, California

PROJECT #:	210509.0336	DATE:	11/2/22
SCALE:	SHOWN	DRAWN BY:	ADA



SESPE CONSULTING, INC.

FIGURE 5	Model Objects and Discrete Receptors Cajon Creek Quarry Project Vulcan Materials Company San Bernardino County, California		
PROJECT #:	210509.0336	DATE:	11/2/22
SCALE:	SHOWN	DRAWN BY:	ADA



30 Year Residential Cancer Risk Isopleth

SESPE CONSULTING, INC.

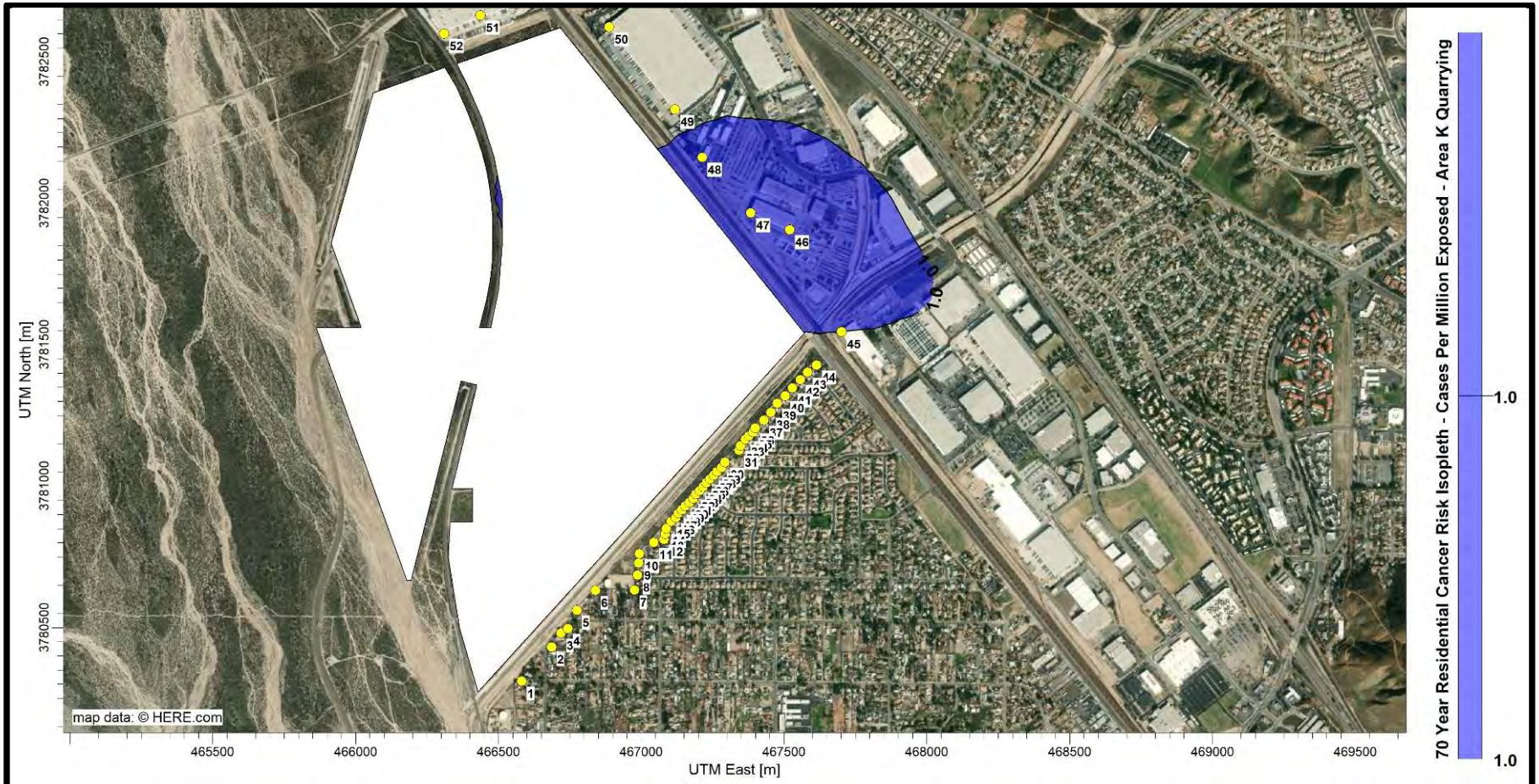
FIGURE	Residential Cancer Risk - Area K Quarrying		
6a	Cajon Creek Quarry Project Vulcan Materials Company San Bernardino County, California		
PROJECT #:	210509.0336	DATE:	6/5/23
SCALE:	SHOWN	DRAWN BY:	ADA



30 Year Residential Cancer Risk Isopleth

SESPE CONSULTING, INC.

FIGURE	Residential Cancer Risk - Area N Quarrying		
6b	Cajon Creek Quarry Project Vulcan Materials Company San Bernardino County, California		
PROJECT #:	210509.0336	DATE:	6/5/23
SCALE:	SHOWN	DRAWN BY:	ADA



70 Year Residential Cancer Risk Isopleth

SESPE CONSULTING, INC.

FIGURE

7a

Residential Cancer Burden Area K

Cajon Creek Quarry Project

Vulcan Materials Company

San Bernardino County, California

PROJECT #:	210509.0336	DATE:	11/2/22
SCALE:	SHOWN	DRAWN BY:	ADA



70 Year Residential Cancer Risk Isopleth

SESPE CONSULTING, INC.

FIGURE

7b

Residential Cancer Burden Area N

Cajon Creek Quarry Project

Vulcan Materials Company

San Bernardino County, California

PROJECT #:	210509.0336	DATE:	11/2/22
SCALE:	SHOWN	DRAWN BY:	ADA

APPENDEIX B EXCERPT FROM AREA Q AQCCIA
APPENDIX G
DATASETS G.1 - G.5

Dataset G.1 - Fugitive Dust Emissions Calculations - Bulldozing and Material Drops

This spreadsheet addresses drops from mobile equipment.

Emission Factors

Material Drop Emission Factor from AP42 13.2.4:

PM10 E.F. (lb/ton) = $k(0.0032)(U/5)^{1.3}/(M/2)^{1.4}$

k = particle size multiplier =	0.35
U = mean wind speed[1] =	5.0
M = material moisture content =	3
PM10 EF (lb/ton) =	0.00063
PM2.5 EF[2] (lb/ton) =	0.00019

Bulldozing Emission Factor from CalEEMod User's Guide

PM_{10} E.F. (lb/hr) = $(s^{1.5}/7.9)*0.75$

$PM_{2.5}$ E.F. (lb/hr) = $5.7*(s^{1.2}/7.9)*0.105$

s = Silt Content =	6.9
Control =	80%
PM_{10} E.F. (lb/hr) =	0.3441421
$PM_{2.5}$ E.F. (lb/hr) =	0.15384591
Annual Maximum Dozer Hours =	3210.09751

Notes:

[1] Mean wind speed based on data for San Bernardino (South Coast) in Table 1 of CalEEMod User Manual Appendix D which states 2.2 m/s (5 mph).

[2] PM2.5 emission factor assumed to be 29.2% of PM10 for material drops based on SCAQMD's *Updated CEIDARS Table with PM2.5 Fractions* for mineral products - loading

Baseline	Throughput			PM10 Emissions			PM2.5 Emissions		
Activity	**Peak Hour (tph)**	**Peak Day (tpd)**	**Peak Annual (tpy)**	**Peak Hour (lb/hr)**	**Peak Day (lb/day)**	**Peak Annual (lb/yr)**	**Peak Hour (lb/hr)**	**Peak Day (lb/day)**	**Peak Annual (lb/yr)**
Excavation to Pile	2,772	33,258	3,134,709	1.76	21.1	1,990	0.51	6.17	581
Loader Drop to Outbound Conveyor	2,772	33,258	3,134,709	1.76	21.1	1,990	0.51	6.17	581
Bulldozing				0.3441	4.130	1,105	0.15	1.85	494
Total:	**3.86**	**46.36**	**5,085.05**	**1.18**	**14.18**	**1,656.11**			

Future	Throughput			PM10 Emissions			PM2.5 Emissions		
Activity	**Peak Hour (tph)**	**Peak Day (tpd)**	**Peak Annual (tpy)**	**Peak Hour (lb/hr)**	**Peak Day (lb/day)**	**Peak Annual (lb/yr)**	**Peak Hour (lb/hr)**	**Peak Day (lb/day)**	**Peak Annual (lb/yr)**
Excavation to Pile	2,772	33,258	3,134,709	1.76	21.1	1,990	0.51	6.17	581
Loader Drop to Outbound Conveyor	2,772	33,258	3,134,709	1.76	21.1	1,990	0.51	6.17	581
Bulldozing				0.34	4.1	1,105	0.15	1.85	494
Total:	**3.86**	**46.36**	**5,085.05**	**1.18**	**14.18**	**1,656.11**			

Table G.2 - Future PM10 Emissions

	Loader	Dozer	Grader	Water Truck	Water Truck
Max Fuel Use Expected for Project (gal/year)*	49159	29461	2367	31490	5037
	PM10 Emissions (g/hp-hr)				
2017	0.060	0.060	0.112	0.119	0.075
2018	0.053	0.053	0.098	0.104	0.066
2019	0.047	0.047	0.084	0.090	0.058
2020	0.041	0.041	0.070	0.075	0.049
2021	0.034	0.034	0.057	0.060	0.041
2022	0.028	0.028	0.043	0.045	0.032
2023	0.021	0.021	0.029	0.030	0.024
2024	0.015	0.015	0.015	0.015	0.015
2025	0.015	0.015	0.015	0.015	0.015
2026	0.015	0.015	0.015	0.015	0.015
2027	0.015	0.015	0.015	0.015	0.015
2028	0.015	0.015	0.015	0.015	0.015
2029	0.015	0.015	0.015	0.015	0.015
2030	0.015	0.015	0.015	0.015	0.015
2031	0.015	0.015	0.015	0.015	0.015
2032	0.015	0.015	0.015	0.015	0.015
	PM10 Emissions (lbs/yr)				
2017	124.20	74.43	11.21	159.12	15.91
2018	110.92	66.47	9.83	139.25	14.09
2019	97.64	58.51	8.44	119.37	12.28
2020	84.36	50.55	7.05	99.50	10.46
2021	71.07	42.59	5.66	79.63	8.65
2022	57.79	34.63	4.28	59.75	6.83
2023	44.51	26.68	2.89	39.88	5.02
2024	31.23	18.72	1.50	20.00	3.20
2025	31.23	18.72	1.50	20.00	3.20
2026	31.23	18.72	1.50	20.00	3.20
2027	31.23	18.72	1.50	20.00	3.20
2028	31.23	18.72	1.50	20.00	3.20
2029	31.23	18.72	1.50	20.00	3.20
2030	31.23	18.72	1.50	20.00	3.20
2031	31.23	18.72	1.50	20.00	3.20
2032	31.23	18.72	1.50	20.00	3.20

*Based on maximum engine fuel use in baseline period.

Dataset G.3 - Baseline and Project Emissions Calculations

Row Labels	Total Production (tons)	Fuel Use (gal)	Tons per Gallon	HC (lb)	CO (lb)	NOx (lb)	PM (lb)
2006	3,134,709	ND	ND	ND	ND	ND	ND
2007	2,606,441	88,374	29	1,040	7,450	16,216	890
2008	1,419,995	125,270	11	753	10,940	14,008	658
2009	1,193,053	16,817	71	126	1,380	2,171	104
2010	1,024,248	57,976	18	335	4,981	6,357	284
2011	1,108,172	76,961	14	525	5,113	9,983	314
2012	1,163,743	81,713	14	612	4,426	11,622	290
2013	1,246,914	88,122	14	678	4,468	12,876	302
2014	1,504,023	115,880	13	914	5,455	17,367	379
2015	1,612,226	112,353	14	886	5,290	16,841	368
2016	1,545,567	101,842	15	800	4,815	15,205	332
2017	1,908,111	106,287	18	843	4,914	16,024	345
Total	19,467,202	971,595	20.0	7,513	59,232	138,669	4,268
Total Without 2009	18,274,149	954,778	19.1	7,386	57,853	136,498	4,164
Total Without Outliers	**12,532,999**	**866,404**	**14.5**	**6,346**	**50,403**	**120,282**	**3,274**
Total 2012 - 2017	**8,980,584**	**606,197**	**14.8**	**4,733**	**29,369**	**89,935**	**2,017**

*Shaded rows represent statistical outliers which have been removed from the dataset

	Tons Produced	Fuel (gal)	HC (lb)	CO (lb)	NOx (lb)	PM (lb)	PM2.5	Sox (lb)	CO2 (lb)	CH4 (lb)	N20 (lb)
Peak Hour Basline	2,772	82	1	5	11	0	0	0.009	1840.3	0.3	0.0
Peak Hour Project	2,772	82	1	4	12	0	0	0.009	1840.3	0.3	0.0
Peak Day Basline	33,258	2,299	16.8	133.8	319.2	8.7	9	0.243	51447.2	7.6	0.5
Peak Day Project	33,258	2,245	17.5	108.8	333.1	7.5	7	0.237	50234.9	7.4	0.5
Max Year Baseline	3,134,709	216701.88	1587.3	12606.6	30084.6	818.8	819	22.916	4849120.5	716.6	47.8
Max Year Project	3,134,709	211595.50	1652.23	10251.27	31392.28	704.03	704	22.376	4734855.6	699.7	46.6

Project emissions calculated based on historical maximum tonnages and emissions per gallon averages from the 2012 to 2017 period.

Peak Hours calculated based on daily tonnage records and assume a 16 hour work day (average hour in peak day) conservatively producing a lower value than the true peak for the baseline condition.

*Baseline Tons per Gallon Statistical Analysis	
Quartile 1:	14.20
Quartile 3:	17.81
Interquartile Range:	3.61
Lower Bound	8.78
Upper Bound	23.23

C02 Content of Diesel Fuel (kg/gal)	10.15	(based on California Climate Action Registry General Reporting Protocol 3.1 Appendix C)
CH4 Content of Diesel Fuel (kg/gal)	0.0015	(based on California Climate Action Registry General Reporting Protocol 3.1 Appendix C)
NO2 Content of Diesel Fuel (kg/gal)	0.0001	(based on California Climate Action Registry General Reporting Protocol 3.1 Appendix C)
Diesel Sulfur Content (ppm)	15	(CARB Ultra Low Diesel Standard)
lb fuel/hp-hr	0.367	(Offroad 2011)
lb fuel/gal	7.05	(AP-42 Appendix A)

G.4 - Summary of Basline and Project Emissions

Baseline	lb/hr									lb/day								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	0.60	4.78	11.42	0.31	0.31	0.01	1840.28	0.27	0.02	16.8	133.8	319.2	8.7	8.7	0.2	51447.2	7.6	0.5
Quarry/Drops	--	--	--	3.86	1.18	--	--	--	--	--	--	--	46	14	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	1.93	0.59	--	--	--	--	--	--	--	23	7	--	--	--	--
Future	lb/hr									lb/day								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	0.64	3.98	12.20	0.27	0.27	0.01	1840.28	0.27	0.02	17.5	108.8	333.1	7.5	7.5	0.2	50234.9	7.4	0.5
Quarry/Drops	--	--	--	3.86	1.18	--	--	--	--	--	--	--	46	14	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	1.93	0.59	--	--	--	--	--	--	--	23	7	--	--	--	--
Project	lb/hr									lb/day								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	0.04	-0.80	0.78	-0.04	-0.04	0.00	0.00	0.00	0.00	0.69	-24.99	13.87	-1.22	-1.22	-0.01	-1212.30	-0.18	-0.01
Quarry/Drops	--	--	--	0	0	--	--	--	--	--	--	--	0	0	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	0	0	--	--	--	--	--	--	--	0	0	--	--	--	--

Baseline	lb/yr									Metric Ton/Year								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	1587	12607	30085	819	819	23	4849120	717	47.8	0.7	5.6	13.4	0.4	0.4	0.01	2164.8	0.3	0.0
Quarry/Drops	--	--	--	5085	1656	--	--	--	--	--	--	--	2.3	0.7	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	2543	828	--	--	--	--	--	--	--	1.1	0.4	--	--	--	--
Future	lb/yr									Metric Ton/Year								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	1652	10251	31392	704	704	22	4734856	700	46.6	0.7	4.6	14.0	0.31	0.31	0.01	2113.8	0.3	0.0
Quarry/Drops	--	--	--	5085	1656	--	--	--	--	--	--	--	2.3	0.7	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	2543	828	--	--	--	--	--	--	--	1.1	0.4	--	--	--	--
Project	lb/yr									Metric Ton/Year								
Source	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O	VOC	CO	NOx	PM10	PM2.5	Sox	CO2	CH4	N2O
Offroad Engines	65	-2355	1308	-115	-115	-1	-114265	-17	-1.1	0.029	-1.1	0.58	-0.05	-0.05	-0.0002	-51	-0.008	-0.0005
Quarry/Drops	--	--	--	0	0	--	--	--	--	--	--	--	0	0	--	--	--	--
Stockpiles/Windblown Dust	--	--	--	0	0	--	--	--	--	--	--	--	0	0	--	--	--	--

Table G.5 Fugitive Dust Speciation

CAS Identification Number	Chemcial Name	Fraction of PM10 Composition
7440382	arsenic	0.000002
7440439	cadmium	0.000039
7440473	chromium	0.000261
7440508	copper	0.000101
7782505	chlorine	0.001452
7439921	lead	0.000942
7439965	manganese	0.001051
7440020	nickel	0.000002
7439976	mercury	0.000019
7782492	selenium	0.000001
7440622	vanadium (fume or dust)	0.000338
1175	Silica, Crystln	0.04

Based on the Terracon lab report dated June 21st, 2018, all arsenic and nickel samples returned Non Detect levels when 100g soil samples were processed with 2 liters of water based solution. Conservatively assuming Nickel and Arsenic are both present in the leachate at the detection level of 0.1 ppm or 0.1 mg/liter, 0.2 mg would have been present in the 100 g soil sample, meaning the soil contained 2ppm of both arsenic and nickel, or 0.000002 as a composition fraction.

APPENDEIX C HEALTH RISK ASSESSMENT METHODOLOGY

CONTENTS

C.1 Introduction 1
C.2 Hazard Identification and Quantification 1
C.3 Exposure Assessment 2
C.3.1 Emission Quantification 2
C.3.2 Modeling of Environmental Transport 2
C.3.3 Evaluation of Environmental Fate 3
C.3.4 Identification of Exposure Routes 4
C.3.5 Identification of Exposed Populations 4
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C.5 Risk Characterization 9
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C.5.2 Non-Cancer Risk 12

C.1 Introduction

HRA was performed using current best practices including methods from the HRA Guidelines (OEHHA, 2015). The four steps involved in the risk assessment process are:

1) hazard identification,
2) exposure assessment,
3) dose-response assessment, and
4) risk characterization.

These four steps were used to assess health risk for the Project and each is discussed in the subchapters below.

C.2 Hazard Identification and Quantification

For air toxics sources, hazard identification involves the pollutant(s) of concern emitted by a facility, and the types of adverse health effects associated with exposure to the chemical(s), including whether a pollutant is a potential human carcinogen or is associated with other types of adverse health effects. Appendix A of the HRA Guidelines includes a list of TACs that are used for HRA in California.

C.3 Exposure Assessment

The purpose of exposure assessment is to estimate the extent of public exposure to emitted substances. In practice this means estimating exposures to TACs including the following tasks: emission quantification, modeling of environmental transport, evaluation of environmental fate, identification of exposure routes, identification of exposed populations, and estimation of short-term (e.g., 1-hour maximum), 8-hour average, and long-term (annual) exposure levels.

C.3.1 Emission Quantification

Emissions were quantified based on the most accurate actual emissions information available. Total hourly and annual emissions from each source was compiled in order to quantify both short term and long term impacts for risk assessment.

C.3.2 Modeling of Environmental Transport

AERMOD is a steady-state plume model based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. CARB recommends AERMOD for air quality HRA (OEHHA, 2015). The process of using air dispersion modeling follows these four steps:

1. Air dispersion modeling is used to estimate annual average and maximum one-hour ground level concentrations (GLC). The air dispersion modeling results are expressed as an air concentration or in terms of (Chi over Q) for each receptor point. (Chi over Q) is the modeled downwind air concentration (Chi) based on an emission rate of one gram per second (Q). (Chi over Q) is expressed in units of micrograms per cubic meter per gram per second, or $(\mu g/m^3)/(g/s)$. (Chi over Q) is sometimes written as (X/Q) and is sometimes referred to as the dilution factor.

2. When multiple substances are evaluated, the X/Q is normally utilized since it is based on an emission rate of one gram per second. The X/Q at the receptor point of interest is multiplied by the substance-specific emission rate (in g/s) to yield the substance-specific GLC in units of $\mu g/m^3$. The following equations illustrate this point.

$$GLC = \left(\frac{X}{Q}\right) \times Q_{Substance}$$

$$\frac{X}{Q} = (Chi\ over\ Q)\ in\ \left(\frac{\mu g/m^3}{g/s}\right), from\ model\ results\ with\ unit\ emission\ rate$$

$$Q_{Substance} = substance\ emission\ rate\ \left(g/s\right)$$

3. The applicable exposure pathways (e.g., inhalation, soil contact, fish consumption) are identified for the emitted substances, and the receptor locations are identified. This determines which exposure algorithms are ultimately used to estimate dose. After the exposure pathways are identified, the fate

and transport algorithms are used to estimate concentrations in the applicable exposure media (e.g., soil or water) and the exposure algorithms are used to determine the substance-specific dose.

4. The dose is used with cancer and noncancer health values to calculate the potential health impacts for the receptor. An example calculation using the high-end point-estimates for the inhalation (breathing) exposure pathway can be found in Appendix I of the HRA Guidelines (OEHHA, 2015).

AERMOD was used as described above to calculate a X/Q for each source-receptor combination by setting the emission rate for each source in the model to one gram per second (1 g/s). Other parameters used in AERMOD describe overall control of the model domain and functionality (e.g., coordinate system, terrain, non-default options, etc.), receptors (e.g., location, height), sources (e.g., size, location, exhaust velocity, temperature, operating schedule), meteorology, and output file options.

The Control Pathway of AERMOD was set to provide output in units of concentration; and both wet and dry plume depletion were disabled. Pollutant/averaging options were set to "Other" with averaging times of 1-hour and the period of the meteorological data file.

Output of the dispersion model in the form of plot files, one for each combination of source and averaging period, that contain X/Q values were then used in HARP2 with the emissions rates presented above and other human exposure parameters discussed below to predict the acute, non-cancer chronic, and cancer risk at each receptor.

C.3.3 Evaluation of Environmental Fate

Once emissions exit the source, the substances emitted will be dispersed in the air. The substances in the exhaust gas with high vapor pressures will remain largely in the vapor phase, and substances with lower vapor pressures will tend to adsorb to fly ash or other particulate matter. The emission plume may contain both condensable and filterable particulates. A semi-volatile organic toxicant can partition into both vapor and particulate phases. Particulates will deposit on vegetation, on soil, and in water at a rate that is dependent on the particle size. The following algorithms are used to estimate concentrations in environmental media including air, soil, water, vegetation, and animal products.

Determination of the concentration in air is made using X/Q and the emissions rate (g/s) as discussed above. The concentration of the substance in soil (Cs) is a function of the deposition, accumulation period, chemical specific soil half-life, mixing depth, and soil bulk density. For simplicity and health protection, the Tier 1 default assumes 30-year soil deposition for the accumulation period, which is the 95th percentile length of residency. The water pathway is evaluated as if a standing water body (e.g., pond or lake) is impacted by facility emissions and is used as a source for drinking water by food-producing animals or humans, or is a source of angler-caught fish. The average concentration of the substance in water (Cw) is a function of direct deposition (material carried in by surface run-off may occur as well but is not modeled). Concentrations in vegetation, animal products, angler caught fish, and mother's milk are predicated on the concentrations estimate to be in the air, water, and soil. The Project HRA includes air, soil ingestion, home grown produce, and mother's milk as pathways of exposure. Detailed discussion of the methodologies used to determine the

concentrations in various media to which receptors may be exposed is located in Subchapter 5.3 of the HRA Guidelines.

C.3.4 Identification of Exposure Routes

Multi-pathway substances have the potential to impact a sensitive receptor through non-inhalation exposure routes. For example, if a hazardous substance is deposited on soil or water which comes into contact with an individual, it will contribute to the overall risk. For further information regarding these exposure routes see the OEHHA Guidance Manual, Table 8.6 Mandatory and Site-Route Dependent Exposure Pathways.

C.3.5 Identification of Exposed Populations

Residential receptors were observed by aerial photo review, and those located closest to the Facility were represented with discrete receptor points in the model. A grid of receptors was also run surrounding the facility and encompassing potentially exposed populations. Larger screen grids were utilized to determine the exposure of the community as a whole, and to ensure that exposure decreased with increased distance from the site.

C.3.6 Estimation of Exposure Levels

Once the concentrations of substances are estimated in air, soil, water, plants, and animal products, they are used to evaluate estimated exposure to people. Exposure is evaluated by calculating the daily dose in milligrams per kilogram body weight per day (mg/kg/d). The HRA Guidelines describe the algorithms used by HARP2 to calculate this dose for exposure through inhalation, dermal absorption, and ingestion pathways. All chemicals are assessed for exposure through inhalation. Emissions of semi-or non-volatile multi-pathway substances (e.g., earth metals in fugitive dust), the soil ingestion pathway and the dermal soil exposure pathway are also assessed. The mother's milk pathway is used depending on the multi-pathway substance released. The Project HRA assessed each of these pathways. The other exposure pathways (e.g., ingestion of water, home-raised animal products, and angler-caught fish) need to be assessed if a survey of the exposure site shows they are present.

C.3.6.1 Inhalation Pathway

The dose through the inhalation route is estimated for cancer risk assessment and noncancer hazard assessment. Residential exposure includes near-continuous long-term exposure at a residence and workers are exposed only during working hours (i.e., 8 hours/day).

Exposure through inhalation is a function of the breathing rate, the exposure frequency, and the concentration of a substance in the air. For residential exposure, the breathing rates are determined for specific age groups, so inhalation dose (Dose-air) is calculated for each of these age groups, 3rd trimester, 0<2, 2<9, 2<16, 16<30 and 16-70 years. OEHHA used the mother's breathing rates to estimate dose for the 3rd trimester fetus assuming the dose to the fetus during the 3rd trimester is the same as the mother's dose. These age-specific groupings are needed in order to properly use the age sensitivity factors for cancer risk assessment. Tier 1 evaluations and the Project HRA use the high-end point estimate (i.e., the 95th

percentiles) breathing rates for the inhalation pathway in order to avoid underestimating cancer risk to the public, including children. The following equation is used to determine dose for the inhalation pathway.

$$Dose_{Air} = C_{Air} \times \left\{\frac{BR}{BW}\right\} \times A \times EF \times 10^{-6}$$

Where:

$Dose_{Air}$ = Dose through inhalation (mg/kg/d)
C_{Air} = Concentration in air (µg/m^3)
{BR/BW} = Daily breathing rate normalized to body weight (L/kg body weight-day)
A = Inhalation absorption factor (unitless)
EF = Exposure frequency (unitless), days/365 days
10^{-6} = Micrograms to milligrams conversion, liters to cubic meters conversion

As discussed above, recommended values for the breathing rate normalized to body weight term, {BR/BW}, are the 95th percentile high-end point estimate that is used for Tier 1 HRAs like this one. This term has several values that are needed to assess cancer risk for each age bins designated in the HRA Guidelines (i.e., third trimester, 0 to 2, 2 to 16 and 16 to 70 years). These values as well as parametric model distributions used for Tier 3 and Tier 4 stochastic analysis are provided in the HRA Guidelines. The inhalation absorption factor, A, is recommended to be assigned a value of one (i.e., 100% of dose is absorbed) but may also be assigned the value determined by the toxicological study upon which the REL for the substance is based. Exposure frequency is recommended to be 350 days for residential exposures. Table 1 presents the mean and high end point estimates for residential intake rates that are assumed in this HRA.

For worker exposure, the HARP2 default assumes working age begins at 16 years, and that exposures to facility emissions occur during the work shift, typically up to 8 hours per day during work days. Breathing rates that occur over an 8-hour period vary depending on the intensity of the activity, and are used to estimate the inhalation dose. The 8-hour breathing rates may also be used for cancer risk assessment of children and teachers exposed at schools during school hours.

Table 1 Point Estimates of Residential Daily Breathing Rates by Age Group

Estimate	3rd Trimester[1] (L/kg BW-day)[2]	0<2 Years (L/kg BW-day)	2<16 Years (L/kg BW-day)	16<30 Years (L/kg BW-day)
Mean (65%ile)[3]	225	658	452	210
High-End (95%ile)	361	1090	745	335

Source: (OEHHA, 2015, pp. 5-25).

1 3rd trimester breathing rates based on breathing rate of pregnant women using the assumption that the dose to the fetus during the 3rd trimester is the same as that to the mother.

2 Values are in units of liters of air per kilogram of body weight per day.

3 Mean values were not used in the HRA and are provided for informational purposes only.

Exposed workers may be engaged in activities ranging from desk work, which would reflect breathing rates of sedentary/passive or light activities, to manual labor activities which induce moderate intensity breathing rates. OEHHA recommends default (Tier 1) point estimate 8-hour breathing rates in L/kg-8-hrs based on the mean and 95th percentile of moderate intensity activities, 170 and 230 L/kg-8-hrs, respectively, for adults 16-70 years old.

Non-cancer health risks were determined in HARP2 by dividing the ground level concentration (GLC) of each pollutant at each receptor by the corresponding reference exposure level (REL, units of $\mu g/m^3$) resulting in a hazard index (HI). The HIs for pollutants affecting each target organ were then summed to determine the total HI for each target organ. The target organ with the greatest HI is reported as the non-cancer health risk at each receptor. The mean and high-end intake rates for workers were 170 and 230 liters per kilogram per 8-hours (L/kg-8-hrs). For cancer risk assessment, workers were assumed to be exposed for 25 years as recommended in the HRA Guidelines (OEHHA, 2015, pp. 5-26).

Annual residential dose was calculated by HARP2 using the GLC (mg/m^3), the intake rate (L/kg-day), 350 days/yr exposure frequency, and an assumption that the entire mass of pollutants inhaled is absorbed into the body of the individual exposed (i.e., no pollutants are exhaled). A fraction of time at home factor (FAH) is used to account for time individuals spend outside of their residence (e.g. at school or work).

Inhalation dose of each pollutant at each receptor for each year was then multiplied in HARP2 by the inhalation cancer slope factor for the pollutant to estimate annual cancer risk in units of excess cancer cases per million individuals exposed. The total cancer risk from inhalation was then calculated by summing the annual risk from each pollutant and year of exposure. Residential cancer risk assumed exposure duration of 30 years as recommended by OEHHA (OEHHA, 2015, pp. 8-1) and the OEHHA Derived Method intake rate for all exposure pathways and all ages which is more conservative than the recommended Risk Management Policy (RMP) (95/80%ile combination for inhalation pathway and 65%ile for other pathways), and RMP Derived Method (95/80%ile combination for two dominant exposure pathways and 65%ile for other pathways). The RMP 95/80%ile combination refers to applying the 95th percentile intake rate for ages less than two years and the 80th percentile intake rate for ages over two years whereas the OEHHA Derived Method uses 95%ile intake rate for all ages and results in greater risk estimates which is conservative.

C.3.6.2 Ingestion Pathway

The average concentration of pollutants in soil is a function of the deposition, accumulation period, chemical specific half-life, mixing depth, and soil bulk density. For simplicity and health protection, the HARP2 default 30-year soil deposition for the accumulation period was assumed. Equations and parameters used to estimate the concentration of pollutant in the soil from the GLC can be found in the HRA Guidelines (p. 5-6 to 5-8).

The residential dose from soil ingestion varies by age and was calculated for each age group. The dose is calculated by HARP2 based on the concentration in soil, pollutant specific gastrointestinal relative absorption fraction (GRAF, unitless), soil ingestion rate (mg/kg-day), and exposure frequency using the equation presented in the HRA Guidelines (p. 5-43). For simplicity, GRAF was assigned a value of one which represents the entire mass of pollutant being absorbed. Soil ingestion rates vary by age and the high-end point estimates shown in Table 2 were used.

Table 2 Soil Ingestion Rate Point Estimates by Age Group

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	0.7	20	3	0.7
High-End (95%ile)	3	40	10	3

Source: (OEHHA, 2015, pp. 5-44).

1 3rd trimester is assumed to be the mother's soil ingestion rate.

2 Values are in units of milligrams of pollutant ingested per kilogram of body weight per year.

3 Geometric mean (GM) values were not used in the HRA and are provided for informational purposes only.

C.3.6.3 Dermal Pathway

Exposure through dermal absorption (dose-dermal) is a function of the soil or dust loading of the exposed skin surface, the amount of skin surface area exposed, and the concentration and availability of the pollutant. The annual dermal load (ADL) is a composite of the body surface area per kg body weight, exposure frequency, and soil adherence to the skin. High-end point estimates of ADL for individuals were chosen based on the appropriate climate of the facility location.

Table 3 Annual Dermal Loading Point Estimates by Age Group (Warm Climate)

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	1,200	3,600	7,500	6,400
High-End (95%ile)	2,600	4,300	9,100	8,500

Source: (OEHHA, 2015, pp. 5-37).

1 3rd trimester based on ADL of mother normalized to body weight assuming exposure to the mother and feus are the same.

2 Values are in units of milligrams of pollutant on skin per kilogram of body weight per year.

3 Mean values were not used in the HRA and are provided for informational purposes only.

Table 7 Annual Dermal Loading Point Estimates by Age Group (Mixed Climate)

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	1,100	2,200	6,600	5,700
High-End (95%ile)	2,400	2,900	8,700	8,100

Source: (OEHHA, 2015, pp. 5-37).

1 3rd trimester based on ADL of mother normalized to body weight assuming exposure to the mother and feus are the same.

2 Values are in units of milligrams of pollutant on skin per kilogram of body weight per year.

3 Mean values were not used in the HRA and are provided for informational purposes only.

High-end ADL was combined with the concentration of pollutant in soil, the fraction absorbed across skin (pollutant-specific factor), the exposure duration (i.e., 30 years) and the averaging time (i.e., 30-year residency period) using equations presented in the HRA Guidelines (p. 5-41) to estimate the dermal dose for each residential receptor. Worker receptors used the adult ADL and omitted exposure duration and averaging time from the calculation.

C.3.6.4 Mother's Milk Pathway

Estimates of the concentration of pollutants in a mother's milk require the use of the air, water, and soil environmental fate evaluations. Infants would be exposed to the pollutants in concentrations equal to the concentrations at which the mother is exposed from birth up to 25 years of age when the infant is born. The exposed infant is assumed to be fully breastfed for the first year of life. The summed average dose daily dose (mg/kg-day) from all pathways is calculated for the nursing mother using equations in the HRA Guidelines (p. 5-59). Breast milk intake rates of 101 and 139 g/kg-day are used by HARP2.

C.4 Dose-Response Assessment

Dose-response assessment is the process of characterizing the relationship between exposure to an agent and incidence of an adverse health effect in exposed populations. In quantitative carcinogenic risk assessment, the dose-response relationship is expressed in terms of a potency slope that is used to calculate the probability or risk of cancer associated with an estimated exposure. Cancer potency factors (CPF) are expressed as the 95th percent upper confidence limit of the slope of the dose response curve estimated assuming continuous lifetime exposure to a substance. Typically, potency factors are expressed as units of inverse dose (e.g., $(mg/kg\ BW/day)^{-1}$) or inverse concentration (e.g., $(\mu g/m3)^{-1}$). It is assumed in cancer risk assessments that risk is directly proportional to dose and that there is no threshold for carcinogenesis. (OEHHA, 2015).

The actual threshold for health effects in the general population is generally not known with any precision. Uncertainty factors are applied to the Lowest Observed Adverse Effects Level (LOAEL) or No Observed Adverse Effects Level (NOAEL) or Benchmark Concentration values from animal or human studies to help ensure that the chronic, 8-hour and acute REL values are below the threshold for human health for nearly all individuals.

Risk characterization is the final step of the HRA. In this step, information developed through the exposure assessment is combined with information from the dose-response assessment to characterize risks to the public from emissions. In California, OEHHA conducts the dose-response assessment during the development of cancer potency factors and Reference Exposure Levels. These are used in conjunction with the exposure estimates to assess cancer risk and evaluate hazard from noncancer toxicity of emitted chemicals. Under AB2588, risk characterizations present both individual and population-wide health risks.

C.5 Risk Characterization

Risk characterization includes the following components:

- The locations of the PMI, the MEIR, and the MEIW are to be identified. The PMI,MEIW, and MEIR for cancer risk and for noncancer hazard indices (averaging times for acute 1-hour, repeated 8-hour, and chronic hazard indices) may not be the same location; all should be identified.
- The location of any public or individual receptors of special interest because of their sensitivity to air pollutants (e.g., schools, hospitals, daycare, or eldercare facilities -contact the District or reviewing authority for more information) should be identified.
- Estimates of population-wide cancer burden.

C.5.1 Cancer Risk

Cancer risk is calculated by multiplying the daily inhalation or oral dose by the cancer potency factor, the age sensitivity factor (ASF) the fraction of time spent at home (FAH) (for residents only), and the exposure duration divided by averaging time, to yield the excess cancer risk. Excess cancer risk is calculated for each age bin and summed to yield cancer risk at the receptor for the entire exposure duration. Descriptions of these age sensitivity factors follow below and may be found in the various technical support documents to the HRA Guidelines.

C.5.1.1 Age Sensitivity Factors

OEHHA has determined that young animals are more sensitive than adult animals to exposure to many carcinogens. Therefore, OEHHA developed age sensitivity factors (ASFs) to consider the increased sensitivity to carcinogens during early-in-life exposure. In the absence of chemical-specific data, OEHHA recommends a default ASF of 10 for the third trimester to age 2 years, and an ASF of 3 for ages 2 through 15 years to account for potential increased sensitivity to carcinogens during childhood. These values manifest in the intake parameters presented below.

C.5.1.2 Frequency of Time Spent At Home

FAH during the day can be used to adjust exposure duration and cancer risk from a specific facility's emissions, based on the assumption that exposure to the facility's emissions are not occurring away from home. From the third trimester to age <2 years, 85% of time is spent at home. From age 2 through <16 years, 72% of time is spent at home. From age 16 years and greater, 73% of time is spent at home. Facilities with a

school within the 1×10^{-6} (or greater) isopleth are directed to use FAH = 1 for the child age groups (3rd Trimester, 0<2 years, and 2<16 years).

C.5.1.3 Exposure Duration

For residential inhalation exposure, cancer risk must be separately calculated for specified age groups because of age differences in sensitivity to carcinogens and age differences in intake rates (per kg body weight). Separate risk estimates for these age groups provide a health-protective estimate of cancer risk by accounting for greater susceptibility in early life, including both age-related sensitivity and amount of exposure. The following equation illustrates the formula for calculating residential inhalation cancer risk.

$$RISK_{inh-r} = DOSE_{air} \times CPF \times ASF \times \frac{ED}{AT} \times FAH$$

Where:

$RISK_{inh-res}$ = Residential inhalation cancer risk
$DOSE_{air}$ = Daily inhalation dose (mg/kg-day)
CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF = Age sensitivity factor for a specified age group (unitless)
ED = Exposure duration (in years) for a specified age group
AT = Averaging time for lifetime cancer risk (years)
FAH = Fraction of time spent at home (unitless)

Cancer risks calculated for individual age groups are summed to estimate the total cancer risk over the period of interest and/or lifetime. Cancer risk is typically expressed in “chances per million” But may also be expressed in other ways, such as “chances per 100,000” or “chances per 10 million”

For assessment of off-site worker cancer risk at the MEIW, the default assumes working age begins at 16 years. The daily inhalation dose ($DOSE_{air}$) is based on the adjusted 8-hour concentration at the MEIW (for non-continuous sources) and amount of time the offsite worker’s schedule overlaps with the facility’s emission schedule. The duration of exposure at the MEIW receptor is 25 years. Additional consideration for offsite worker cancer risk assessment is whether there are women of child bearing age at the MEIW location and whether the MEIW has a daycare center. Under most circumstances, cancer risk accumulated by inhalation is calculated using the following equation:

$$RISK_{inh-work} = DOSE_{air} \times CPF \times ASF \times \frac{ED}{AT}$$

Where:

$RISK_{inh-work}$ = Woker inhalation cancer risk
$DOSE_{air}$ = Daily inhalation dose (mg/kg-day)
CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

ASF = Age sensitivity factor for a specified age group (one for working age 16 to 70)
ED = Exposure duration (in years) for a specified age group (25 years)
AT = Averaging time for lifetime cancer risk (70 years)

As discussed previously, some substances (e.g., certain semi-volatile organics and metals) are carcinogenic regardless of how they enter the body. Exposures to these substances are called multi-pathway. HRA for a facility that emits a multi-pathway pollutant must, at a minimum, evaluate doses from soil ingestion and dermal exposure. If polycyclic aromatic hydrocarbons, lead, dioxins, furans, or polychlorinated biphenyls are emitted, then the breast-milk consumption pathway becomes mandatory for residential receptors. OEHHA has developed transfer coefficients for these chemicals from the mother to breast milk. The other exposure pathways (e.g., ingestion of homegrown produce or fish) are only evaluated for residential receptors if the facility impacts that exposure medium and the receptor under evaluation can be exposed to that medium or pathway. For example, if the facility does not impact a fishable body of water within the isopleth of the facility, or the impacted water body does not sustain fish that are consumed by fishers, then the fish pathway will not be considered for that facility or receptor.

Non-inhalation residential cancer risk is calculated using the same steps as inhalation cancer risk. The pathway under evaluation (e.g., soil ingestion) is multiplied by the substance-specific oral slope factor, expressed in units of inverse dose (i.e., $(mg/kg/day)^{-1}$), the appropriate ASF, and exposure duration divided by averaging time to yield the cancer risk for a specified age grouping. Cancer risk for each age group is summed as appropriate for the exposure duration.

If multiple substances are emitted, the substance-specific cancer risk for each exposure pathway is summed to give the (total) multi-pathway cancer risk at the receptor location. HARP2 displays the multi-pathway risk for each carcinogenic substance and a breakdown of the cancer risk from each exposure pathway.

This HRA evaluates mother's milk due to presence of lead in fugitive dust. The default assumption inherent in the intake rate is that the infant's only source of food is breast for the first year (e.g., is fully breastfed), which is one-half of the 0<2 year age group used in the Hot Spots program. Thus, the cancer risk by the mother's milk pathway is calculated with a slightly modified equation using a different exposure duration. Once the cancer risk is determined for the mother's milk pathway then it is summed with the other risks to calculate the total cancer risk for the receptor.

For facilities with large emission footprints (e.g., refineries, ports, or rail yards, etc.), population-based health impacts are critical to provide a better illustration of the potential impacts of emissions since large numbers of people may be exposed to the emissions without notification, albeit at relatively low levels (up to 10 in one million). The individual cancer risk approach discussed above has inherent limitations in protecting public health. Both large and small facilities, even those with a single stack, can impact a few individuals with an individual cancer risk that is unacceptable, whereas a large facility may have an individual cancer risk that is acceptable but exposes many more people. Thus, the population-wide impacts are potentially greater for the large facility. Population-wide risk is based on individual risk, and assumes that a population (not necessarily

the same individuals) will live in the impacted zone over a 70-year period, whereas individuals are exposed for 30 years as that is the 95th percentile of inhabitance duration.

To evaluate population risk, one method that regulatory agencies have used is cancer burden to account for the number of excess cancer cases that could occur in a region. The cancer burden can be calculated by multiplying the cancer risk at each census block centroid by the number of people living in the census block. The product is summed to estimate the number of potential cancer cases.

Cancer burden is independent of how many people move in or out of the vicinity of an individual facility. For example, if 10,000 people are exposed to a carcinogen at a concentration with a 1×10^{-5} cancer risk for a lifetime the cancer burden is 0.1, and if 100,000 people are exposed to a 1 × 10^{-5} risk the cancer burden is 1.

C.5.2 Non-Cancer Risk

Estimates of noncancer inhalation health impacts are determined by dividing an airborne concentration at the receptor by the appropriate REL. This is termed the Hazard Index (HI) Approach. A REL is used as an indicator of potential noncancer health impacts and is defined as the concentration at which no adverse noncancer health effects are anticipated. When a health impact calculation is performed for a single substance, then it is called the hazard quotient (HQ). Each REL for a substance will have one or more target organ systems (e.g., respiratory system, nervous system, etc.) where the substance can have a noncancer health impact. Thus, all HQs have specified target organ systems associated with them. The sum of the Hazard HQs of all chemicals emitted that impact the same target organ is the HI. Inhalation RELs for noncancer health impacts have been developed for acute, 8-hour, and chronic exposures to a number of substances.

Acute RELs are designed to protect against the maximum 1-hour ground level concentration at locations accessible by the public. Chronic RELs protect against long-term exposure to the annual average air concentration spread over 24 hours/day, 7 days/week.

Eight-hour chronic RELs are designed to protect people with daily 8-hour schedules, such as offsite workers, in an impacted zone. The 8-hour RELs are used for typical daily work shifts of 8-9 hours and represent concentrations which health impacts are unexpected even for sensitive subpopulations. The 8-hour RELs can be used to evaluate the potential for health impacts (from repeated daily exposures) in offsite workers, and to children and teachers exposed during school hours.

As discussed above, to calculate the acute, 8-hour, or chronic HQ, the maximum ground-level concentration (in µg/m^3) during the appropriate period of time (i.e., 1-hour acute, 8-hour, and 1-year chronic) is divided by the corresponding REL (in µg/m^3) for the substance. If a receptor is exposed to multiple substances that target the same organ system, then the HQs for the individual substances are summed to obtain a Hazard Index (HI) for that target organ as shown in the following equations.

$$HI_{Organ1} = \frac{C_{air,1}}{REL_1} + \frac{C_{air,2}}{REL_2} + \cdots + \frac{C_{air,n,}}{REL_n}$$

or

$$HI_{Organ} = HQ_1 + HQ_2 + \cdots + HQ_n$$

A HI of 1.0 or less indicates that adverse health effects are not expected to result from exposure to emissions of that substance. As the HI increases above one, the probability of human health effects increases by an undefined amount. However, HI above one is not necessarily indicative of health impacts due to the application of uncertainty factors in deriving the RELs.

There are non-cancer multi-pathway pollutants that are assessed for inhalation, ingestion, and other non-inhalation pathways. Nickel and arsenic are two that are found in fugitive dust and so the non-inhalation exposures to these metals are assessed for the corresponding target organs. Specifically, nickel effects the respiratory, hematologic, and alimentary systems while arsenic affects development; the nervous and cardiovascular systems; and the skin.

APPENDEIX D WHAT CONSTITUTES AN ADVERSE HEALTH EFFECT OF AIR POLLUTION?

American Thoracic Society

What Constitutes an Adverse Health Effect of Air Pollution?

THIS OFFICIAL STATEMENT OF THE AMERICAN THORACIC SOCIETY WAS ADOPTED BY THE ATS BOARD OF DIRECTORS, JULY 1999

PURPOSE OF THE STATEMENT

As the twentieth century ends, the health effects of outdoor air pollution remain a public health concern in developing and developed countries alike. In the United States, the principal pollutants monitored for regulatory purposes (carbon monoxide, nitrogen dioxide, sulfur dioxide, particles, ozone, and lead; see Table 1) show general trends of declining concentrations, although ozone pollution now affects many regions of the country besides southern California (1). Yet, even at levels of air pollution now measured in many cities of the United States, associations between air pollution levels and health indicators are being demonstrated at concentrations around those set by standards of the U.S. Environmental Protection Agency (2, 3). In many countries of the developing world, concentrations of air pollutants are rising with industrialization and the increasing numbers of motor vehicles (4, 5). Extremely large and densely populated urban areas, often referred to as "megacities," have the potential to generate unprecedented air quality problems.

There are common principles to air quality management throughout the world. Public health protection unifies all approaches, whether based on voluntary guidelines, mandated standards for concentrations, or source control. The intent is to limit or to avoid any impact of air pollution on the public's health. Air quality management is thus based on a scientific foundation built from the epidemiologic, toxicologic, and clinical evidence on health effects of air pollution. In interpreting this evidence for public health protection, there is a need to identify those effects that are considered "adverse" and to separate them from those effects not considered adverse.

The American Thoracic Society has previously provided guidance on the distinction between adverse and nonadverse health effects of air pollution in its 1985 statement, "Guidelines as to What Constitutes an Adverse Respiratory Health Effect" (6). Definitions of adverse effects have also been offered by the World Health Organization (7–10), but the guidance of the American Thoracic Society has received particular emphasis in the United States. Preparation of the original statement was intended to coincide with consideration of the passage of an amended Clean Air Act and to provide a framework for interpreting scientific evidence relevant to the mandate of the act. In particular, the Clean Air Act requires that the Administrator of the Environmental Protection Agency promulgate, for certain pollutants, standards that will be sufficient to protect against adverse effects of the air pollutants on health. The act is silent on the definition of "adverse effect" and, at the time of the 1985 statement, there was considerable controversy around the interpretation of this language as revision of the act was being considered. Recognizing the need of policy makers for expert guidance, the American Thoracic Society released the 1985 statement, which to date constitutes the sole set of recommendations on this issue from an expert panel convened by a health organization.

The American Thoracic Society has revised the 1985 statement because new scientific findings, published since the original statement, have again raised questions as to the boundary between adverse and nonadverse in considering health effects of air pollution. These new findings reflect improved sensitivity of research approaches and the application of biomarkers that can detect even subtle perturbations of biologic systems by air pollutants. Epidemiologic research designs have been refined and large sample sizes and increasingly accurate methods for exposure assessment have increased the sensitivity of epidemiologic data for detecting evidence of effects. New statistical approaches and advances in software and hardware have facilitated analyses of large databases of mortality and morbidity information. The design of clinical studies-including controlled exposures of volunteers-has also advanced and biologic specimens may be obtained after exposure, for example, by fiberoptic bronchoscopy, to identify changes in levels of markers of injury. Toxicologic studies have also gained in sophistication through incorporation of more sensitive indicators of effect and the careful tracing of the relationship between exposure and biologically relevant doses to target sites, which may now be considered at a molecular level.

New dimensions have been added to the array of outcome measures. Medical outcomes research now recognizes that patient well-being should be broadly conceptualized and measured rigorously, in addition to considering the biological process of the disease itself. As a result, health-related quality of life, the perception of well-being, is now considered a necessary component of outcomes research. Validated instruments have been developed to assess the impact of health-related symptoms and impairment on functional status and quality of life (11-14). The formalization of the concept of environmental justice acknowledges that the effects of specific pollutants cannot be evaluated in isolation without giving consideration to the overlapping exposures of populations, often minority group members of low socioeconomic status, who live in neighborhoods that are heavily exposed to multiple environmental contaminants (15).

This new statement, like the 1985 statement, is intended to provide guidance to policy makers and others who interpret the scientific evidence on the health effects of air pollution for the purpose of risk management. The statement does not offer strict rules or numerical criteria, but rather proposes principles to be used in weighing the evidence and setting boundaries between adverse and nonadverse health effects. Even if the technical tools were available for scaling the consequences of air pollution on the multiple relevant axes, the placement of dividing lines should be a societal judgment and consequently

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TABLE 1

U.S. NATIONAL AMBIENT AIR QUALITY STANDARDS*

Pollutant	NAAQS Concentration (ppm)	NAAQS Concentration ($\mu g/m^3$)	Standard Type
Particulate matter ≥ 10 Pm (PM_{10})			
24-h average		150	Primary and secondary
Annual arithmetic mean		50	Primary and secondary
Particulate matter ≥ 2.5 μm ($PM_{2.5}$)			
24-h average		65	Primary and secondary
Annual arithmetic mean		15	Primary and secondary
Ozone (O_3)			
24-h average	0.12	235	Primary and secondary
Annual arithmetic mean	0.08	157	Primary and secondary
Sulfur dioxide (SO_2)			
24-h average	0.14	365	Primary
Annual arithmetic mean	0.03	80	Primary
3-h average	0.50	1,300	Secondary
Nitrogen dioxide (NO_2)			
Annual arithmetic mean	0.053	100	Primary and secondary
Carbon monoxide (CO)			
1-h average	35	40	Primary
8-h average	9	10	Primary
Lead (Pb)			
Quarterly average		1.5	Primary and secondary

* For detailed information on scientific bases and policy considerations underlying decisions establishing the NAAQS listed here, see the AQCDs, staff papers, and NAAQS Promulgation notices cited in text. Such information can also be obtained from several internet websites (e.g., http://www.epa.giv/airs/criteria.html; http://www.epa.gov/oar/oaqps/publicat.html; and http://www.epa.gov/ncea/biblio.htm).

TABLE 2

ADVERSE RESPIRATORY HEALTH EFFECTS

A. Increased mortality (*Increased* as used here and subsequently means significantly [$p < 0.05$] increased above that recorded in some standard, comparable population. In selected situation, $p < 0.1$ may be appropriate)
B. Increased incidence of cancer
C. Increased frequency of symptomatic asthmatic attacks
D. Increased incidence of lower respiratory tract infections
E. Increased exacerbations of disease in persons with chronic cardiopulmonary or other disease that could be reflected in a variety of ways
   1. Less able to cope with daily activities (i.e., shortness of breath or increased anginal episodes)
   2. Increased hospitalization, both frequency and duration
   3. Increased emergency ward or physician visits
   4. Increased pulmonary medication
   5. Decreased pulmonary function
F. Reduction in FEV_1 or FVC associated with clinical symptoms
   1. Chronic reduction in FEV, or FVC associated with clinical symptoms
   2. A significant increase in number of persons with FEV_1 below normal limits: chronically reduced FEV, is a 'predictor of increased risk of mortality. Transient or reversible reductions that are not associated with an asthmatic attack appear to be less important. It should be emphasized that a small but significant reduction in a population mean FEV, or $FEV_{.75}$ is probably medically significant, as such a difference may indicate an increase in the number of persons witn respiratory impairment in the population. In other words, a small part of the population may manifest a marked change that is medically significant to them, but when diluted with the rest of the population the change appears to be small
   3 An increased rate of decline in pulmonary function (FEV,) relative to the predicted value in adults with increasing age or failure of children to maintain their predicted FEV, growth curve. Such data must be standardized for sex, race, height, and other demographic and anthropometric factors
G. Increased prevalence of wheezing in the chest apart from colds, or of wheezing most days or nights. (The significance of wheezing with colds needs more study and evaluation.)
H. Increased prevalence or incidence of chest tightness
I. Increased prevalence or incidence of cough/phlegm production requiring medical attention
I. Increased incidence of acute upper respiratory infections that interfere with normal activity
K. Acute upper respiratory tract infections that do not interfere with normal activity
L. Eye, nose, and throat irritation that may interfere with normal activity (i.e., driving a car) if severe
M. Odors

this committee does not propose specific boundaries for separating adverse from nonadverse effects.

OVERVIEW OF THE 1985 STATEMENT

The 1985 statement of the American Thoracic Society was directed at respiratory health effects of air pollution and emphasized the interpretation of the epidemiologic evidence. The statement recognized the spectrum of responses to air pollution, which begins with exposure and evidence of exposure and ends at death. This spectrum has been characterized as a pyramid, based in the most common consequence-exposure-and having mortality, the least common and most severe consequence, at its tip. The statement included a table that lists adverse respiratory health effects, seemingly in order of declining severity (Table 2). The 1985 statement hinged the distinction between adverse and nonadverse effects on medical considerations. The committee recognized that the boundary is further influenced by societal considerations: "Where one draws the line to categorize it as an adverse health effect or an action level between pathophysiologic or physiologic change is probably best left to the individual or the community."

The committee's definition of adverse respiratory health effects was ". medically significant physiologic or pathologic changes generally evidenced by one or more of the following: (*1*) interference with the normal activity of the affected person or persons, (2) episodic respiratory illness, (3) incapacitating illness, (4) permanent respiratory injury, and/or (5) progressive respiratory dysfunction." The committee noted that all changes are not adverse, citing the example of carboxyhemoglobin. The level of carboxyhemoglobin, beyond that from endogenous production, is indicative of exposure but it is not predictive of adverse effects until reaching threshold levels, depending on the effect and the susceptibility of the exposed person. The statement recognized that a distinction should be drawn between effects to individuals and effects to populations and that populations are heterogeneous in their susceptibility. The comment was offered that a change in a population could be "medically significant" for that group. The statement also provides guidance on interpretation of'reversible effects and on interpreting irreversible effects. In acknowledging that research would continue to address uncertainties, the committee recommended that the guidelines should be periodically reviewed and updated.

METHODOLOGY FOR DEVELOPING THIS STATEMENT

Following the recommendation of the committee that authored the 1985 statement, the Environmental and Occupational Health Assembly of the American Thoracic Society recognized a need to reconvene a group to review and revise the prior statement. The statement had been used for more than a decade and new investigative approaches were being used to identify effects of air pollution that were not considered by the first committee. In addition, societal perspectives had shifted since the early 1980s and a forma1 concern for the impact of air

pollution on specific groups had been expressed through the environmental justice movement.

To revise the statement, a multidisciplinary committee was convened in 1997 that included expertise in pulmonary medicine, public health, epidemiology, both clinical and animal toxicology, biochemistry, and cellular and molecular biology. This committee conducted several planning meetings and consulted experts in environmental economics and in ethics. In addition, a multidisciplinary workshop was convened to gain input from the range of groups potentially interested in the statement and its application. The committee's approach was discussed at a symposium held at the 1999 Annual Meeting of the American Thoracic Society. After further revisions, the statement was reviewed and submitted to the Board of the American Thoracic Society.

BACKGROUND ON THE CLEAN AIR ACT

The preparation of the original statement was largely motivated by potential ambiguity in interpreting the language of the Clean Air Act, which addresses adverse effects of air pollution without providing clear guidance as to the distinction between adverse and nonadverse effects. In addition, questions regarding this distinction arise repeatedly in interpreting the findings of research studies, whether observational or experimental. Consequently, the 1985 statement has had broader application than just the interpretation of evidence on air pollution and health for the purpose of promulgating air quality regulations. Nonetheless, the committee found the legislative history of the Clean Air Act to be relevant to its charge.

The first national legislation on air pollution, the Air Pollution Control Act, was passed in the mid-1950s; the original Clean Air Act was passed in 1963 and last revised in 1990. The act is lengthy and complex in its provisions; most relevant to considerations in defining an adverse health effect are Sections 108 (Air Quality Criteria and Control Techniques), 109 (National Ambient Air Quality Standards), and 112 (Hazardous Air Pollutants). National Ambient Air Quality Standards (NAAQS) are set individually for six prevalent pollutants (Table 1), often referred to as "criteria pollutants." They are so designated because of the requirement for comprehensively reviewing relevant information in a criteria document. The primary NAAQS are to be set at a level that protects the public health with an adequate margin of safety, regardless of economic or technical feasibility of attainment. The secondary standards are concerned with welfare and environmental consequences.

The hazardous air pollutants, as defined in Section 112, are not covered under Sections 108 and 109 as criteria pollutants. In 1990, the Congress offered a list of 189 such pollutants and a process for listing and delisting substances. The 1990 Clean Air Act states: "The Administrator shall periodically review [and revise] the list [of 189 hazardous air pollutants] by. adding pollutants which present, or may present, through inhalation or other routes of exposure, a threat of adverse human health effects (including, but not limited to substances which are known to be, or may reasonably be anticipated to be, carcinogenic, mutagenic, teratogenic, neurotoxic, which cause reproductive dysfunction, or which are acutely or chronically toxic). ." Section 112(f)(2) further directs the Environmental Protection Agency to assess whether the emissions standards for the listed hazardous air pollutants required under other subsections "provide an ample margin of safety to protect public health" and if not, then the agency is to develop standards that will address the "remaining risk."

The historical record provides an indication of the intent of the Congress in framing the language of the Clean Air Act with regard to protection of the public's health. Research now shows that the most highly susceptible individuals may respond to common exposures that are often at or close to natural background pollutant levels.

With regard to sensitivity, the 1970 Clean Air Act recognized that some persons were so ill as to need controlled environments, e.g., persons in intensive care units or newborn infants in nurseries; the act stated that the standards might not necessarily protect such individuals. It further stated, however, that the standards should protect "particularly sensitive citizens such as bronchial asthmatics and emphysematics who in the normal course of daily activity are exposed to the ambient environment." The act further suggested that the adequacy of any standard could be tested in a statistically representative sample of sensitive individuals. The hearing record on the 1970 act is informative. Dr. Hon T. Middleton (Commissioner, National Air Pollution Control Administration, Department of Health, Education, and Welfare) addressed the Senate Subcommittee on Air and Water Pollution of the Committee on Public Works on May 27, 1970. He testified that the intent of any national air quality standard is to be "protective of health in all places" and set at a level below which effects have not been observed. Dr. Middleton recognized the difficulty of finding a demarcation point of exposure below which there is no effect and he noted that there may be subtle effects and evolving scientific understanding.

Further difficulties in the language of the Clean Air Act were later noted in ***A Legislative History of the Clean Air Act Amendments of 1977: A Continuation of the Clean Air Act Amendments of 1970.*** This document noted the difficulty of applying the margin of safety and the erosion of margins of safety by advancing scientific knowledge. The document also commented on the implicit assumption of a safe threshold in the language of the act and the implausibility of this assumption. The report questioned whether the NAAQS (I) protect against genetic mutations, birth defects, and cancer, (2) take sufficient account of the consequences of long-term low-level exposures or short-term peaks, and (3) sufficiently consider synergism among pollutants and the formation of secondary pollutants, e.g., sulfates, with their own toxicity. These considerations remain relevant more than 20 years later.

This selective review of the historical record indicates that Congress intended that the NAAQS would afford health protection not only to the general population but to subgroups with enhanced susceptibility to air pollution, including people with asthma and people with chronic obstructive lung disease. Nevertheless, it is also clear that some exquisitely susceptible individuals might remain outside the ambit of protection of the NAAQS. A margin of safety was to be provided but quantitative specification was not offered. The evolutionary nature of the supporting scientific evidence was repetitively acknowledged and the need to distinguish adverse from nonadverse effects was at least implicitly recognized. The current language of Section 112 explicitly acknowledges the possibility of shifting understanding of risks of specific hazardous air pollutants.

GENERAL CONSIDERATIONS

In preparing the statement, the committee identified several general considerations that are relevant to interpreting evidence on the health effects of air pollution. Each of these considerations and the committee's judgment as to their proper weighting are detailed below.

Population Health versus Individual Risk

The effects of air pollution can be viewed in the complementary contexts of the increment of an individual's risk for disease—the clinician's measure of impact-and of the additional risk incurred by a population, which is the public health perspectivc (16). Both perspectives arc relevant to interpreting research findings on air pollution and to regulations that are protective of the public's health. Any risk incurred by an exposed individual beyond some boundary, determined by the individual or on a societal basis, could be deemed unacceptable. For example. prolonged exposure to a respiratory carcinogen could result in an individual-level incremental risk of exposure of 10^{-4}, more than two orders of magnitude lower than the baseline lifetime individual risk in the United States. Nevertheless, among an exposed population of IO', the estimated number of cancer cases that might result from such an exposure would number 10^{3}, illustrating that minute individual risks may be significant from the standpoint of population exposures.

Exposure could also enhancc risk for a population to an unacceptable degree, perhaps without shifting the risks of any particular individuals to an unacceptable level. Figure 1 illustrates the distinction. In Figure l A, the population's distribution of exposure shifts toward a higher level and some members of thc population cross the boundary to an unacceptable risk. In Figure lB, the shift affects the position of the population distribution, but no individuals move to an unacceptable level of risk. Effects on persons with asthma are illustrative. A population of children with asthma could have a distribution of lung function such that no individual child has a level associated with significant impairment. Exposure to air pollution could shift the distribution toward lower levels without bringing any individual child to a level that is associated with clinically relevant consequences. Individuals within the population would, however, have diminished reserve function and are at potentially increased risk if affected by another agent, e.g., a viral infection. Assuming that thc relationship between the risk factor and the disease is causal, the committee considered that such a shift in thc risk factor distribution, and hence the risk profilc of the exposed population. should be considered adverse, even in thc absence of the immediate occurrence of frank illness.

Ethics and Equity

The past decade has brought increasing concern over the ethics of heterogeneous, inequitable distributions of environmental and occupational exposures (IS). Within the United States, some groups receive disproportionate exposures to environmental agents that arc injurious to health; the environmental justice movement seeks to redress these inequities. The exposures of concern originate in breathing polluted outdoor air, living in substandard housing with indoor air pollution problems, including exposures to certain bioacrosols and combustion products, and working in jobs with occupational respiratory risks. Groups encompassed by this movement in the United States include various racial and ethnic minority populations. particularly thosc living within urban areas, and the socioccconomically disadvantaged. In the developing world, such exposures can occur at substantially higher levels and may, in some instances, extend to a majority of a given nation's population. Limited access to care and medications may enhance susceptibility to pollution.

The concept of environmental equity had not been formally voiced when the 1985 statement was written. The present committee viewed inequities of exposure as potentially representing a form of susceptibility to air pollution. In other words, individuals within the target groups may be at increased risk of experiencing adverse effects from a given level of ambient air pollution because their baseline risk level may have been raised by other exposures. Moreover, in some instances there may be genetic and nutritional factors enhancing susceptibility as well. It should be noted, however, that there are other exposure scenarios and other subpopulations with increased baseline risks that are not formally included within the environmental justice movement. The heterogeneity of populations needs full acknowledgment, whether it reflects disproportionate noxious exposures or other factors. Observing that there have been few investigations of the effects of other exposures, genetics, or nutrition on susceptibility to air pollution-related effects, either in the United States or internationally, the committee issued a call for additional research in these areas.

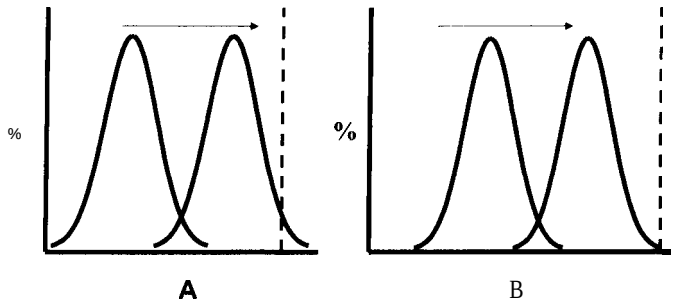


Figure 7. Hypothetical distributions **of exposure for two populations, *A* and *B*. (See text for explanation.)**

Economic Costs

Adverse health effects of air pollution incur costs, including direct costs of providing treatment for illness and indirect costs of lost work time and productivity. Cost-benefit analysis provides an estimate of the balancing of the costs of controls against the benefits; cost effectiveness analysis provides an indication of the level of control accomplished in relation to costs. Cost-benefit and cost-effectiveness analysis are assumption-laden tools now being used for policy-making purposes. Cost estimates depend on the valuation given to illness, lost work time and productivity, and even to lost life. It has been proposed that cost-benefit analysis may facilitate the process of deciding whether a given air pollution-related health impact should be considered adverse. The legislative history of the Clean Air Act explicitly excludes consideration of economic factors in setting ambient air quality standards or in developing emissions standards for hazardous air pollutants. In the context of air quality regulation, cost-benefit analysis is a multistep process involving the articulation of value judgments regarding potential costs (expenditures of public and private resources to reduce pollutant emissions and exposures) versus benefits (avoidance of specified adverse health impacts in a designated population). Benefits, in theory, should be quantified as the willingness of beneficiaries to pay to avoid the adverse impact. In practice, quantification of such health impacts from exposure to air pollution is often based on direct costs related to medical treatment and indirect costs such as school absenteeism, lost work time, decreased productivity, and, at the extreme, person-years of life lost. Valuations of a given effect may vary internationally, as differences in population age distributions, comorbidity, nutritional status, and other circumstances can affect this process. Ideally, cost–bene-

fit analysis should make explicit the value judgments underlying these assessments, highlighting distinctions among alternative pollution control strategies to achieve specific air quality standards. Willingness of individuals to pay to avoid adverse health effects is also estimated from responses to contingent valuation surveys and from market data concerning choices about employment that carries health risks.

Nevertheless, the committee concurred that the specification of which health effects should be considered adverse must precede the application of cost-benefit analysis for evaluation of air pollution control strategies. That is, once a given outcome is designated as adverse, this information can be used as input to cost-benefit analysis. Estimates of costs associated with a given health outcome. while useful from a public policy perspective, cannot be translated into any clinical or biological framework to distinguish adverse from nonadverse effects. Therefore, the committee concluded that however valuable this economists' tool may be for regulatory decision-making, cost-benefit analysis lay outside the scope of this position paper and, indeed, the expertise of the American Thoracic Society.

Susceptibility

The issue of susceptibility has been recognized throughout the history of our initiatives to regulate outdoor air pollution. Susceptibility, broadly defined, may include extrinsic factors, including the profile of exposures to other pollutants, for example, in the workplace or at home, and intrinsic factors, for example, genotype. The size of the population of individuals susceptible to indoor air pollution is large, potentially including infants and the elderly, persons with chronic heart and lung diseases, and the immunocompromised. Persons with multiple deleterious exposures may also be considered as having heightened susceptibility, particularly if the combined effects of the agents are synergistic. Even with the populations considered as susceptible there is a distribution of the degree of susceptibility. For example, levels of nonspecific airway responsiveness in persons with asthma span several orders of magnitude.

The current explosive growth in knowledge of the genetic basis of lung disease, including responses to environmental agents, will provide increasing insights into the mechanistic basis of susceptibility and provide markers of risk status. We already have evidence of between-person variation in the pulmonary function response to ozone and interstrain variation in the pulmonary effects of environmental exposures, including criteria pollutants, in rodent species. As we develop the capacity to more precisely identify those at risk, we may find it increasingly challenging to assure protection for all individuals against adverse health effects.

The present committee agreed with the principle espoused in the Clean Air Act: that regulations should extend protection to include those with enhanced susceptibility to air pollution, recognizing that some highly susceptible individuals may still respond to low-level exposures. Research now shows that some highly susceptible individuals may respond to common exposures that are often unavoidable. Furthermore, by definition, susceptible individuals cannot have the same margin of safety as the nonsusceptible groups within the population.

Heterogeneity of Perspectives

In society there is an extraordinary range of views on environmental issues and tolerance of risk. Looking more globally to other developed countries and to the developing countries, the range of perspectives is even broader. The committee acknowledges that any defined boundaries for distinguishing adverse health effects may not be embraced by all groups. This heterogeneity and the possibility that some may reject the committee's proposal challenged the committee to recommend in principle that control measures should maximize public health benefits while assuring equity.

DIMENSIONS OF ADVERSE EFFECTS

Biomarkers

Biomarkers are indicators of exposure, effect, or susceptibility that are measured in biologic materials, such as blood or bronchoalveolar lavage fluid. The concept of biomarkers has been formalized since the 1985 statement (17) and since then. a continuously increasing number of candidate indicators of exposure, effect, and susceptibility have been developed and applied in laboratory studies of humans and animals and in both occupational and environmental population studies. The progressive refinement of techniques in the field of cellular and molecular biology, and the burgeoning understanding of the complex chemical intracellular and cell-to-cell signaling pathways collectively termed "cytokines" (18), have rapidly expanded the spectrum of candidate markers of effects. It is now possible to detect very early, or initiating phases of responses at the molecular level, such as the production of mRNA for cytokines. Similarly, the progressive development of genetic assays and understanding of the human genome have provided numerous candidate markers of both effects and susceptibility (19).

Biomarkers relevant to air pollution have been measured in blood, exhaled air, urine, sputum, and in bronchoalveolar lavage fluids and tissue specimens collected by bronchoscopy. Bronchoalveolar lavage fluids, for example, are now frequently analyzed for cell numbers and types, cytokines (e.g., several interleukins and tumor necrosis factor α), enzymes (e.g., lactate dehydrogenasc and β-glucoronidase), fibronectin, protein, arachidonic acid metabolites, and reactive oxygen species. Because many of the epithelial cell types of the nasopharyngeal region are similar to epithelia and responses in the trachea, bronchi, and bronchioles, responses of nasal cells have been examined as potential biomarkers for their ability to predict parallel responses in lung airways, which are more difficult to sample.

Biomarkers have been extensively applied in toxicologic studies of air pollution, both in animals and in clinical studies involving exposures of human volunteers. The biomarkcrs are examined for their ability to provide evidence of "biologically effective" doses, including the earliest phases of homeostatic responses, the occurrence of injury, outcomes that are intermediate between injury and disease, and the presence of established disease processes. Genetic markers of susceptibility have begun to be applied to the respiratory system, and this application will undoubtedly expand rapidly. A frequent goal of biomarker development is the ability to readily measure changes that precede and predict continued or progressive events leading to clinical effects and disease (Figure 2).

To date, although biomarkers have proved informative about homeostatic adjustments to exposure and the mechanisms of injury and disease, lack of validation against previously established measures of effect. such as clinical status or even physiologic impairment, remains an important weakness. We do not know if elevations of biomarkers during short-term experimental exposures signal risk for ongoing injury and clinical effects or simply indicate transient responses that can provide insights into mechanisms of injury. The utility of some older biomarkers is well established, such as the relationships among carboxyhemoglobin. exposure to carbon monoxide,

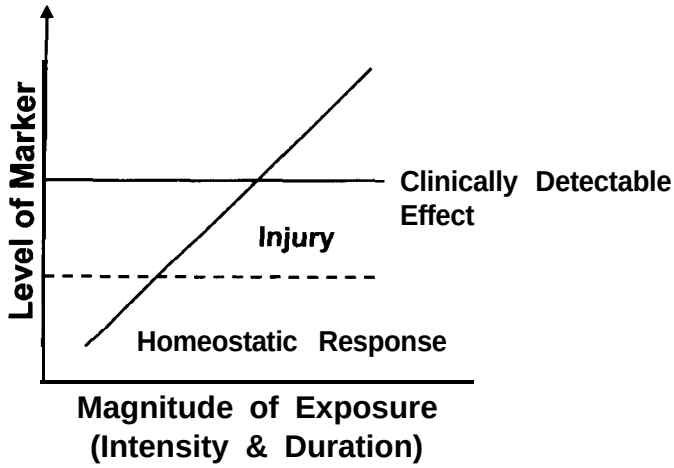


figure 2. Schema for considering biomarkers of response.

impairment of oxygen-carrying capacity, and the risk for angina in the presence of ischemic heart disease. However, the interpretative value for the majority of the many promising new cytokine and genetic biomarkers remains to be established. Not only is it difficult to assess the value of many biomarkers for distinguishing between physiological, homeostatic responses and injury, but it is also difficult to judge the value of changes during short-term exposures for predicting ongoing injury or risk for longer-term clinical effects.

The committee concluded that the continued development of biomarkers is an important need because of their considerable potential not only for detecting the adverse effects of air pollution exposure, but also for aiding the determination of the types and levels of response that should be considered adverse. We often do not know in a parallel, iterative manner, whether the exploration and validation of biomarkers will unquestionably advance our understanding of the mechanisms of homeostatic and injury responses. At this time, however, few of the rapidly growing list of candidate biomarkers have been validated to such an extent that their responses can be used with confidence to define the point at which a response should be equated to an adverse effect warranting preventive measures. Thus, we presently have only a very modest ability to translate evidence from biomarkers directly into a taxonomy of adverse health effects. Consequently, the committee cautions that not all changes in biomarkers related to air pollution should be considered as indicative of injury that represents an adverse effect.

Quality of Life

Health, in its broadest definition, includes not only the absence of disease but the attainment of well-being. Since the preparation of the 198.5 statement, the National Institutes of Health, the Centers of Disease Control, the Food and Drug Administration, and the World Health Organization have broadened their perspective of health to incorporate the concept of health-related quality of life as a valid and important health outcome. Health-related quality of life (HRQL) refers to the individual's perception of well-being, and includes such factors as self-care functioning, mental health, pain, and sense of overall well-being. Decreased health-related quality of life is widely accepted to be an adverse health effect. For this reason, measurable negative effects of air pollution on quality of life, whether for persons with chronic respiratory conditions or the population in general, were consequently considered by this committee to be adverse health effects. Air pollution exposure can adversely affect several domains of quality of life including physical functioning (particularly for persons with respiratory or cardiovascular conditions) and general well-being. Stinging, watery eyes resulting from air pollution not only reflect a chronic physical symptom but may decrease overall quality of life. Outdoor air pollution and odors have been associated with psychiatric symptoms, including anxiety and depression. Increased levels of some air pollutants have been reported to be associated with an increase in psychiatric admissions. The potential effects of air pollution and respiratory symptoms on different domains of quality of life are illustrated in Figure 3.

Measurement of the impact of air pollution on health-related quality of life can be accomplished either by measuring specific domains that may be influenced by air quality (e.g., anxiety, functional status), or by using specific quality of life instruments designed to measure multiple health-related domains (e.g., MOS-SF-36, St. George's Respiratory Questionnaire). The cost-benefits of improved air quality on health-related quality of life could also be measured by the use of quality of life measures that employ utility rating scales. The effects of air pollution of a magnitude considered to be clinically significant with these instruments should be regarded as adverse in interpreting evidence on the health effects of air pollution, regardless of the affected dimension. Additional research is needed to develop an information base for interpreting data from new and more sensitive instruments directed specifically at air pollution.

Physiological impact

The 198.5 statement acknowledged a distinction between reversible and irreversible effects. Healthy persons may sustain transient reductions in pulmonary function associated with air pollution exposure, e.g., reduction of the forced vital capacity (FVC) with exercise at times of higher levels of ozone pollution. However, the committee recommends that a small, transient loss of lung function, by itself, should not automatically be designated as adverse. In drawing the distinction between adverse and nonadverse reversible effects, this committee recommended that reversible loss of lung function in combination with the presence of symptoms should be considered as adverse. This recommendation is consistent with the 1985 statement. The Environmental Protection Agency has also needed to address the interpretation of such data. The Envi-

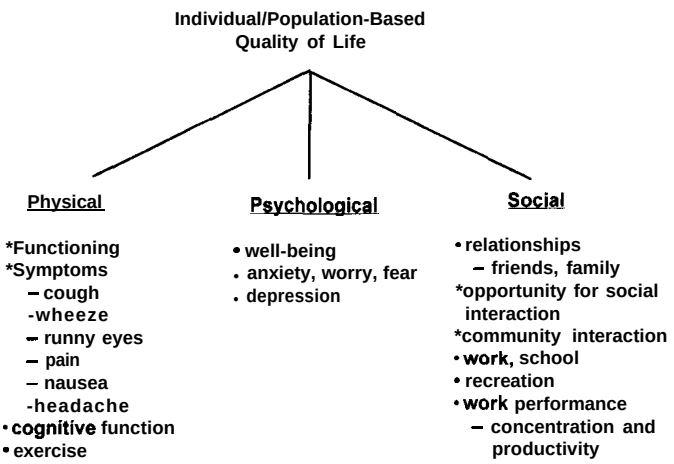


Figure 3. Quality of life domains vulnerable to the adverse health/respiratory effects of air pollution.

ronmental Protection Agency, in its 1989 review of ozone (20), offered a graded classification of lung function changes in persons with asthma. Reduction of the forced expiratory volume in 1 s (FEV_1) was graded as mild, moderate, or severe for reductions of less than 10%, 10–20%, and more than 20%, respectively. This classification has not been validated for acceptability or against other measures.

There is also epidemiologic evidence that air pollution may adversely affect lung growth or accelerate the age-related decline of lung function. Epidemiologic studies are limited in their power to detect such permanent effects and any evidence of association between air pollution exposure and permanent loss of function is indicative of an adverse effect at the population level. Some individuals may sustain clinically relevant, permanent losses of lung function. This committee considered that any detectable level of permanent lung function loss attributable to air pollution exposure should be considered as adverse.

Symptoms

Air pollution exposure can evoke symptoms in persons without underlying chronic heart or lung conditions and also provoke or increase symptom rates in persons with asthma and chronic obstructive lung disease. The Environmental Protection Agency also offered a scale for cough and pain on taking a deep breath in its 1989 ozone review (20). "Infrequent cough" was classified as "None/Normal."

Do all levels of increased symptom occurrence constitute an adverse health effect? The committee judged that air pollution-related symptoms associated with diminished quality of life or with a change in clinical status should be considered as adverse at the individual level. Characterizing the degree of symptomatology associated with diminished quality of life is an appropriate focus for research and a topic that could be investigated using new approaches for assessing quality of life. A change in clinical status can be appropriately set in a medical framework as one requiring medical care or a change in medication. At the population level, any detectable increment in symptom frequency should be considered as constituting an adverse health effect.

Clinical Outcomes

A wide range of clinical outcome measures has been considered in relation to air pollution, including population-level effects, such as increases in numbers of emergency room visits for asthma or hospitalizations for pneumonia, and individual-level effects, such as increased need for bronchodilator therapy. The present committee shared the view of the previous group: detectable effects of air pollution on clinical measures should be considered adverse.

At the population level, the magnitude of the detectable air pollution effect will depend on the extent of the data available for evaluation and methodological aspects of the data, including the degree of error affecting exposure and outcome variables. With large databases, seemingly modest effects may be detectable. However, the committee recommends that no level of effect of air pollution on population-level clinical indicators can be considered acceptable.

Mortality

Following the development of new approaches for the analysis of time-series data, extensive analyses have now been reported on the relationship between daily mortality counts and levels of air pollution on the same or prior days. Several prospective cohort studies have also addressed the effect of longer-term indicators of air pollution exposure on mortality, controlling for relevant individual factors, including age, sex, cigarette smoking, and occupational exposures, among others. Cross-sectional studies-comparing mortality across locations having different levels of air pollution while controlling for a variety of potential confounding factors-have also been conducted. The air pollution-associated mortality findings figured prominently in the recent revision of the U.S. NAAQS for particulate matter.

Associations between air pollution levels and daily mortality counts have been interpreted by some as reflecting the impact of air pollution on a pool of frail individuals with severe underlying heart or lung disease. One explanation for the day-to-day associations attributes them to a brief advancement of the time of death for extremely frail individuals who would have been expected to die soon even in the absence of an air pollution-related insult (21). Work has shown, however, that while this phenomenon of advancement, referred to as mortality displacement, may occur, it cannot provide a full explanation of the associations repeatedly found between daily fluctuations of air pollution and mortality (22, J. Schwartz, "Harvesting and long term exposure effects in the relationship between air pollution and mortality" [1999, unpublished manuscript]). In addition, some mortality time-series studies have found effects across all age strata, not just among the elderly or the very young, suggesting potentially substantial effects on person-years of life lost. Finally, studies of long-term exposures have shown a gradient of mortality risk from cardiopulmonary disease as well as differences in life expectancy across cities with different long-term pollution levels. Thus, although we still have little insight into the extent to which mortality displacement occurs, the evidentiary ensemble from several types of study designs consistently shows that air pollution can shorten the life span to an unacceptable degree.

Risk Assessment

Since the publication of the 1985 statement, quantitative risk assessment has emerged as a key tool for summarizing information on risks to health from environmental agents. Quantitative risk assessment offers a framework for organizing information on risks within its four elements: hazard identification, exposure assessment, dose-response assessment, and risk characterization. The findings of a risk assessment, encompassed in the risk characterization component, may include an overall assessment of impact, a description of the distribution of risk in the population, and an evaluation of risk for susceptible persons within the population. Quantitative risk assessment has been a cornerstone in evaluating risks of environmental carcinogens and we anticipate increasing application to non-carcinogenic health effects of environmental agents, including air pollution.

In interpreting the findings of risk assessments, guidance can be found in precedents offered by key interpretations of regulatory requirements, including the Supreme Court's decision on the benzene standard proposed by the Occupational Safety and Health Administration, and in pollutant-specific regulatory actions. Risks may be couched as the numbers of attributable events in the population and also as the level of risk incurred by individual members of the population.

The committee recognized the rising use and potential utility of quantitative risk assessment in characterizing the health effects of air pollution. However, the committee noted that the results of quantitative risk assessment can often be sensitive to assumptions regarding the distribution and magnitude of exposure, the choice of an appropriate dose-response relationship, and other input decisions. Judgments on acceptability of risk are societal and made through complex regulatory

processes involving extensive public input. The committee did not consider that its mandate extended to offering specific guidance on acceptable risk levels for populations or individuals, nor is risk assessment an appropriate basis for determining what constitutes an adverse effect.

CONCLUSIONS

Since the preparation of the 1985 statement of the American Thoracic Society, there have been tremendous advances in the scientific methods used to investigate the health effects of air pollution. These advances range from the molecular to the behavioral levels of inquiry. As a result, this statement covers topics that are new since the 1985 statement. Yet, this committee, like the 1985 group, was confronted by a lack of formal research or investigation on the very topic of this statement: the boundary between adverse and nonadverse effects. Consequently, the committee needed to exercise its collective judgment on matters that should be based in some broader, societal decision-making **process. Its recommendations are summarized below.**

- ***Biomarkers.*** Few of the rapidly growing list of candidate biomarkers have been validated sufficiently that their responses can be used with confidence to define the point at which a response should be equated to an adverse effect warranting preventive measures. The committee cautions that not all changes in biomarkers related to air pollution should be considered as indicative of injury that represents an adverse effect.
- ***Quality of life.*** Decreased health-related quality of life is widely accepted as an adverse health effect. For this reason, measurable negative effects of air pollution on quality of life, whether for persons with chronic respiratory conditions or for the population in general, were consequently considered to be adverse by this committee.
- ***Physiological impact.*** The committee recommends that a small, transient loss of lung function, by itself. should not automatically be designated as adverse. In drawing the distinction between adverse and nonadverse reversible effects, this committee recommended that reversible loss of lung function in combination with the presence of symptoms should be considered adverse. This committee considered that any detectable level of permanent lung function loss attributable to air pollution exposure should be considered adverse.
- ***Symptoms.*** The committee judged that air pollution-related symptoms associated with diminished quality of life or with a change in clinical status should be considered adverse at the individual level.
- ***Clinical outcomes.*** The present committee shared the view of the previous group: detectable effects of air pollution on clinical measures should be considered as adverse.
- ***Mortality.*** This committee agreed with the conclusion articulated by the 1985 group that any effect on mortality should be judged as adverse. In addition, we are now faced with the challenge of interpreting the findings of time-series studies of effects on short time frames. In interpreting this type of evidence, consideration needs to be given to the extent of life-shortening underlying the association.
- ***Population health versus individual risk.*** Assuming that the relationship between the risk factor and the disease is causal, the committee considered that such a shift in the risk factor distribution, and hence the risk profile of the exposed population, should be considered adverse, even in the absence of the immediate occurrence of frank illness.

This statement was prepared by an ad-hoc committee of the Assembly on Environmental and Occupational Health. Members of the committee are:

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References

1. **U.S. Environmental Protection** Agency (EPA). 1993. National Air Quality and Emissions Trends Report, 1992. Office of Air and Radiation/ Office of Air Quality Planning and Standards, Research Triangle Park, NC. Report No. EPA-454/R-93-031.
2. American Thoracic Society, Committee of the Environmental and Occupational Health Assembly, R. Bascom, P. A. Bromberg, D. A. Costa, R. Devlin, D. W. Dockery, M. W. Frampton, W. Lambert, J. M. Samet, F. E. Speizer, and M. Utell. 1996. Health effects of outdoor air pollution. Part 1. *Am. J. Respir. Crit. Care Med.* 153:3–50.
3. American Thoracic Society, Committee of the Environmental and Occupational Health Assembly, R. Bascom, P. A. Bromberg, D. A. Costa, R. Devlin, D. W. Dockery, M. W. Frampton, W. Lambert, J. M. Samet, F. E. Speizer, and M. Utell. 1996. Health effects of outdoor air pollution. Part 2. *Am. J. Respir. Crit. Care Med.* 153:477–498.
4. McMichael, A. J. 1995. Planetary Overload: Global Environmental Change and the Health of the Human Species. Cambridge University Press, New York.
5. World Health Organization, United Nations Environment Programme. 1992. Urban Air Pollution in Megacities of the World. Blackwell Publishers, Oxford.
6. American Thoracic Society. 1985. Guidelines as to what constitutes an adverse respiratory health effect, with special reference to epidemiologic studies of air pollution. Am. *Rev.* Respir. *Dis.*131:666–669.
7. World Health Organization (WHO). 1958. Definition of Adverse Effect according to the Report of the WHO: Air Pollution, Fifth Report of the Expert Committee on Environmental Sanitation. World Health Organization, Geneva. Technical Report Series No. 157.
8. World Health Organization (WHO). 1972. Definition of Adverse Effect according to the Report of the WHO: Air Quality Criteria and Guides for Urban Air Pollutants. World Health Organization. Geneva. Technical Report Series No. 506.
9. World Health Organization (WHO). 1978. Distinctions between **Adverse** and Non-adverse Effects according to EHC 6: Principles and Methods for Evaluating the Toxicity of Chemicals. World Health Organization, Geneva.
10. World Health Organization (WHO). 1987. Air Quality Guidelines for Europe, European Series No. 23. World Health Organization, Copenhagen.

11. Leplege. A., and S. Hunt. 1997. The problem of quality of life in medicine. *J. Am. Med. Assoc.* 278:47–50.
12. Bergner, M., R. A. Bobbitt, W. B. Carter, and B. S. Gibson. 1981. The Sickness Impact Profile: development and final revision of a health status measure. *Med. Care* 19:787–804.
13. Guyatt, G. H., D. H. Feeny, and D. L. Patrick. 1993. Measuring health-related quality of life. *Ann. Intern. Med.* 1181622629.
14. McHorney, C. A., J. E. Ware, and A. E. Raczek. 1993. The MOS 36-item short-form health survey (SF-36): II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. Med. Care 31:247–263.
1.5. Institute of Medicine. 1999. Toward Environmental Justice: Research, Education. and Health Policy Needs. National Academy Press, Washington, DC.
16. Rose, G. 1992. The Strategy of Preventive Medicine, Oxford University Press, Oxford.
17. National Research Council (NRC), Commission on Life Sciences, Board on Toxicology and Environmental Health Hazards, and Committee on the Epidemiology of Air Pollutants. 1985. Epidemiology and Air Pollution. National Academy Press, Washington, DC.
18. Crystal, R. G. 1997. The Lung: Scientific Foundations, Lippincott-Raven, Philadelphia.
19. Mendelsohn, M. L., L. C. Mohr, and J. P. Peeters. 1998. Biomarkers: Medical and Workplace Applications. Joseph Henry Press, Washington, DC.
20. U.S. Environmental Protection Agency (EPA). 1989. Review of the National Ambient Air Quality Standard for Ozone, Assessment of Scientific and Technical Information. EPA, Research Triangle Park, NC. EPA-450/2-92.
21. U.S. Environmental Protection Agency, Air Quality Strategies and Standards Division. 1998. Revised Ozone and Particulate Matter (PM) National Ambient Air Quality Standards. U.S. Environmental Protection Agency, Washington, DC.
22. Zeger, S. L., F. Dominici, and J. Samet. 1999. Harvesting-resistant estimates of air pollution effects on mortality. *Epidemiology* 10:171–175.

APPENDEIX E OPERATION EMISSIONS

Emissions Quantification and Model Input Summary

Table E.1 Emissions Quantities and Sources

Emission Source	Source Description	Emission Type	Data Source Reference	lb/yr	lb/hr
Off-Road Equipment Engines	Loader, Dozer, Grader, and Water Truck Engine Emissions	Diesel PM10	Area Q EIR, Dataset G.2 (annual) Sum of Equipment in 2024, Dataset G.3 (hourly)	74.65	0.27
Dozing	Dozer operation in quarry	Fugitive Dust PM10	Area Q EIR, Dataset G.1	1105	0.34
Transfer Points	Loader Drop to conveyor staging, loader drop to outbound conveyor	Fugitive Dust PM11	Area Q EIR, Dataset G.1	3980	3.52

Source: Air Quality, Health Risk, and Climate Change Impact Assessment for the Area Q Quarry Project, San Bernardino County, California, Dated April 8, 2020

The Area Q AQCCIA was part of a Certified CEQA Environmental Impact Report for the Area Q facility.

This health risk assessment assumes no change in activity levels, however newer techonologies will increase fuel efficiency making this evaluation conservative.

Table E.2 Fugitive Dust Toxics Speciations

Emissions Source	Toxic Air Contaminant (TAC)	TAC Pollutant ID	TAC Factor by Weight
Aggregates Transfer Fugitive Ems	Aluminum	7429905	0.015
	Arsenic	7440382	0.000022
	Barium	7440393	0.000225
	Beryllium	7440417	0.000001
	Cadmium	7440439	0.000001
	Chromium	7440473	0.000028
	Cobalt	7440484	0.000011
	Copper	7440508	0.000037
	Lead	7439921	0.00005
	Manganese	7439965	0.00053
	Nickel	7440020	0.000028
	Crystalline Silica	1175	0.1
	Selenium	7782492	0.000001
	Zinc	7440666	0.000099
Quarry Fugitive Emissions	Aluminum	7429905	7.85E-03
	Arsenic	7440382	1.70E-05
	Barium	7440393	0.000078
	Beryllium	7440417	1.00E-06
	Cadmium	7440439	1.00E-06
	Hexavalent Chromium	18540299	0.00E+00
	Chromium	7440473	4.60E-05
	Cobalt	7440484	7.00E-06
	Copper	7440508	2.60E-05
	Lead	7439921	2.20E-05
	Manganese	7439965	4.25E-04
	Nickel	7440020	4.70E-05
	Selenium	7782492	1.00E-06
	Crystalline Silica	1175	1.00E-01
	Zinc	7440666	6.10E-05

Aggregates Emissions Speciation:

From SDACPD "T01 - Transfer Point, Process Material, Dry, Uncontrolled..." updated 08/26/99

https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/mineral-products-industry-aggregate-transfer-point/APCD-Transfer-Point-Process-Material-Dry-Uncontrolled.pdf

Stockpile and Quarrying Emissions Speciation:

Taken from SDAPCD "Q03, Quarry Operations..." updated 04/20/2022

https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/mineral-products-industry-open-material-storage-piles/APCD-Open-Material-Storage-Areas-Dozer-Mining-Operations.pdf

APPENDEIX F HEALTH RISK ASSESSMENT RESULTS

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1	464902.60	3779643.20	-8.46E-09	0	0	-9.66E-10	0
2	465077.34	3779643.20	-1.01E-08	0	0	-1.15E-09	0
3	465252.08	3779643.20	-1.19E-08	0	0	-1.36E-09	0
4	465426.82	3779643.20	-1.41E-08	0	0	-1.61E-09	0
5	465601.56	3779643.20	-1.67E-08	0	3.40E-05	-1.90E-09	0
6	465776.30	3779643.20	-1.97E-08	0	0	-2.25E-09	0
7	465951.04	3779643.20	-2.28E-08	0	0	-2.60E-09	0
8	466125.78	3779643.20	-2.62E-08	0	0	-2.99E-09	0
9	466300.52	3779643.20	-3.02E-08	0	0	-3.45E-09	0
10	466475.26	3779643.20	-3.38E-08	0	0	-3.85E-09	0
11	466650.00	3779643.20	-3.81E-08	0	1.40E-05	-4.35E-09	0
12	466824.74	3779643.20	-4.17E-08	0	0	-4.77E-09	0
13	466999.48	3779643.20	-4.47E-08	0	0	-5.11E-09	0
14	467174.22	3779643.20	-4.67E-08	0	0	-5.33E-09	0
15	467348.96	3779643.20	-4.74E-08	0	0	-5.42E-09	0
16	467523.70	3779643.20	-4.68E-08	0	0	-5.35E-09	0
17	467698.44	3779643.20	-4.49E-08	0	0	-5.13E-09	0
18	467873.18	3779643.20	-4.20E-08	0	5.70E-06	-4.80E-09	0
19	468047.92	3779643.20	-3.85E-08	0	0	-4.40E-09	0
20	468222.66	3779643.20	-3.47E-08	0	0	-3.96E-09	0
21	468397.40	3779643.20	-3.08E-08	0	0	-3.52E-09	0
22	464902.60	3779825.88	-8.55E-09	0	0	-9.76E-10	0
23	465077.34	3779825.88	-1.03E-08	0	0	-1.17E-09	0
24	465252.08	3779825.88	-1.24E-08	0	0	-1.42E-09	0
25	465426.82	3779825.88	-1.50E-08	0	0	-1.71E-09	0
26	465601.56	3779825.88	-1.81E-08	0	0	-2.07E-09	0
27	465776.30	3779825.88	-2.17E-08	0	5.80E-05	-2.48E-09	0
28	465951.04	3779825.88	-2.61E-08	0	0	-2.98E-09	0
29	466125.78	3779825.88	-3.07E-08	0	0	-3.51E-09	0
30	466300.52	3779825.88	-3.62E-08	0	0	-4.13E-09	0
31	466475.26	3779825.88	-4.13E-08	0	0	-4.72E-09	0
32	466650.00	3779825.88	-4.75E-08	0	0	-5.43E-09	0
33	466824.74	3779825.88	-5.31E-08	0	0	-6.06E-09	0
34	466999.48	3779825.88	-5.78E-08	0	0	-6.60E-09	0
35	467174.22	3779825.88	-6.09E-08	0	0	-6.96E-09	0
36	467348.96	3779825.88	-6.21E-08	0	0	-7.09E-09	0
37	467523.70	3779825.88	-6.11E-08	0	0	-6.98E-09	0
38	467698.44	3779825.88	-5.81E-08	0	0	-6.63E-09	0
39	467873.18	3779825.88	-5.37E-08	0	1.49E-05	-6.13E-09	0
40	468047.92	3779825.88	-4.84E-08	0	0	-5.52E-09	0
41	468222.66	3779825.88	-4.27E-08	0	0	-4.88E-09	0
42	468397.40	3779825.88	-3.72E-08	0	5.02E-05	-4.25E-09	0
43	464902.60	3780008.56	-8.59E-09	0	0	-9.81E-10	0
44	465077.34	3780008.56	-1.04E-08	0	0	-1.19E-09	0
45	465252.08	3780008.56	-1.27E-08	0	0	-1.45E-09	0
46	465426.82	3780008.56	-1.56E-08	0	0	-1.79E-09	0
47	465601.56	3780008.56	-1.93E-08	0	0	-2.20E-09	0
48	465776.30	3780008.56	-2.38E-08	0	0	-2.72E-09	0
49	465951.04	3780008.56	-2.94E-08	0	9.75E-05	-3.36E-09	0
50	466125.78	3780008.56	-3.62E-08	0	0	-4.14E-09	0
51	466300.52	3780008.56	-4.36E-08	0	0	-4.98E-09	0
52	466475.26	3780008.56	-5.17E-08	0	0	-5.91E-09	0
53	466650.00	3780008.56	-6.03E-08	0	0	-6.89E-09	0
54	466824.74	3780008.56	-6.89E-08	0	3.59E-05	-7.87E-09	0
55	466999.48	3780008.56	-7.66E-08	0	0	-8.75E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
56	467174.22	3780008.56	-8.18E-08	0	0	-9.34E-09	0
57	467348.96	3780008.56	-8.38E-08	0	0	-9.57E-09	0
58	467523.70	3780008.56	-8.21E-08	0	0	-9.38E-09	0
59	467698.44	3780008.56	-7.72E-08	0	0	-8.82E-09	0
60	467873.18	3780008.56	-7.01E-08	0	0	-8.00E-09	0
61	468047.92	3780008.56	-6.20E-08	0	0	-7.08E-09	0
62	468222.66	3780008.56	-5.33E-08	0	0	-6.09E-09	0
63	468397.40	3780008.56	-4.53E-08	0	1.14E-04	-5.17E-09	0
64	464902.60	3780191.24	-8.53E-09	0	0	-9.74E-10	0
65	465077.34	3780191.24	-1.04E-08	0	0	-1.19E-09	0
66	465252.08	3780191.24	-1.28E-08	0	0	-1.46E-09	0
67	465426.82	3780191.24	-1.60E-08	0	0	-1.82E-09	0
68	465601.56	3780191.24	-2.02E-08	0	0	-2.30E-09	0
69	465776.30	3780191.24	-2.56E-08	0	0	-2.93E-09	0
70	465951.04	3780191.24	-3.27E-08	0	0	-3.73E-09	0
71	466125.78	3780191.24	-4.15E-08	0	1.43E-04	-4.74E-09	0
72	466300.52	3780191.24	-5.21E-08	0	0	-5.95E-09	0
73	466475.26	3780191.24	-6.44E-08	0	0	-7.36E-09	0
74	466650.00	3780191.24	-7.77E-08	0	0	-8.88E-09	0
75	466824.74	3780191.24	-9.16E-08	0	0	-1.05E-08	0
76	466999.48	3780191.24	-1.05E-07	0	0	-1.20E-08	0
77	467174.22	3780191.24	-1.14E-07	0	0	-1.30E-08	0
78	467348.96	3780191.24	-1.18E-07	0	0	-1.34E-08	0
79	467523.70	3780191.24	-1.15E-07	0	0	-1.31E-08	0
80	467698.44	3780191.24	-1.06E-07	0	0	-1.21E-08	0
81	467873.18	3780191.24	-9.40E-08	0	0	-1.07E-08	0
82	468047.92	3780191.24	-8.08E-08	0	0	-9.23E-09	0
83	468222.66	3780191.24	-6.72E-08	0	1.04E-04	-7.68E-09	0
84	468397.40	3780191.24	-5.55E-08	0	0	-6.34E-09	0
85	464902.60	3780373.92	-8.19E-09	0	0	-9.35E-10	0
86	465077.34	3780373.92	-1.02E-08	0	0	-1.16E-09	0
87	465252.08	3780373.92	-1.27E-08	0	0	-1.45E-09	0
88	465426.82	3780373.92	-1.61E-08	0	0	-1.83E-09	0
89	465601.56	3780373.92	-2.05E-08	0	0	-2.35E-09	0
90	465776.30	3780373.92	-2.67E-08	0	0	-3.05E-09	0
91	465951.04	3780373.92	-3.52E-08	0	0	-4.01E-09	0
92	466125.78	3780373.92	-4.66E-08	0	0	-5.32E-09	0
93	466300.52	3780373.92	-6.13E-08	0	1.56E-04	-7.00E-09	0
94	466650.00	3780373.92	-1.02E-07	0	0	-1.16E-08	0
95	466824.74	3780373.92	-1.25E-07	0	0	-1.43E-08	0
96	466999.48	3780373.92	-1.49E-07	0	0	-1.70E-08	0
97	467174.22	3780373.92	-1.67E-07	0	0	-1.91E-08	0
98	467348.96	3780373.92	-1.74E-07	0	0	-1.99E-08	0
99	467523.70	3780373.92	-1.69E-07	0	0	-1.93E-08	0
100	467698.44	3780373.92	-1.52E-07	0	0	-1.74E-08	0
101	467873.18	3780373.92	-1.30E-07	0	0	-1.48E-08	0
102	468047.92	3780373.92	-1.07E-07	0	2.75E-06	-1.22E-08	0
103	468222.66	3780373.92	-8.59E-08	0	0	-9.81E-09	0
104	468397.40	3780373.92	-6.84E-08	0	0	-7.81E-09	0
105	464902.60	3780556.60	-7.52E-09	0	5.04E-05	-8.59E-10	0
106	465077.34	3780556.60	-9.49E-09	0	2.82E-05	-1.08E-09	0
107	465252.08	3780556.60	-1.21E-08	0	0	-1.38E-09	0
108	465426.82	3780556.60	-1.56E-08	0	0	-1.79E-09	0
109	465601.56	3780556.60	-2.04E-08	0	0	-2.33E-09	0
110	465776.30	3780556.60	-2.71E-08	0	0	-3.09E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
111	465951.04	3780556.60	-3.66E-08	0	0	-4.18E-09	0
112	466125.78	3780556.60	-5.04E-08	0	0	-5.76E-09	0
113	466300.52	3780556.60	-7.02E-08	0	0	-8.02E-09	0
114	466824.74	3780556.60	-1.76E-07	0	0	-2.01E-08	0
115	466999.48	3780556.60	-2.21E-07	0	8.60E-05	-2.53E-08	0
116	467174.22	3780556.60	-2.60E-07	0	0	-2.97E-08	0
117	467348.96	3780556.60	-2.77E-07	0	0	-3.16E-08	0
118	467523.70	3780556.60	-2.64E-07	0	0	-3.01E-08	0
119	467698.44	3780556.60	-2.30E-07	0	0	-2.62E-08	0
120	467873.18	3780556.60	-1.86E-07	0	0	-2.13E-08	0
121	468047.92	3780556.60	-1.45E-07	0	1.68E-04	-1.66E-08	0
122	468222.66	3780556.60	-1.11E-07	0	0	-1.27E-08	0
123	468397.40	3780556.60	-8.47E-08	0	7.54E-05	-9.67E-09	0
124	464902.60	3780739.28	-6.66E-09	0	0	-7.61E-10	0
125	465077.34	3780739.28	-8.43E-09	0	0	-9.62E-10	0
126	465252.08	3780739.28	-1.09E-08	0	5.85E-05	-1.24E-09	0
127	465426.82	3780739.28	-1.43E-08	0	8.02E-05	-1.63E-09	0
128	465601.56	3780739.28	-1.92E-08	0	0	-2.19E-09	0
129	465776.30	3780739.28	-2.62E-08	0	0	-3.00E-09	0
130	465951.04	3780739.28	-3.66E-08	0	0	-4.18E-09	0
131	466125.78	3780739.28	-5.23E-08	0	0	-5.98E-09	0
132	466300.52	3780739.28	-7.66E-08	0	0	-8.75E-09	0
133	466999.48	3780739.28	-3.49E-07	0	0	-3.98E-08	0
134	467174.22	3780739.28	-4.41E-07	0	0	-5.03E-08	0
135	467348.96	3780739.28	-4.84E-07	0	0	-5.53E-08	0
136	467523.70	3780739.28	-4.54E-07	0	0	-5.18E-08	0
137	467698.44	3780739.28	-3.70E-07	0	0	-4.23E-08	0
138	467873.18	3780739.28	-2.78E-07	0	1.08E-04	-3.17E-08	0
139	468047.92	3780739.28	-2.01E-07	0	0	-2.29E-08	0
140	468222.66	3780739.28	-1.45E-07	0	5.81E-05	-1.65E-08	0
141	468397.40	3780739.28	-1.07E-07	0	9.23E-05	-1.22E-08	0
142	464902.60	3780921.96	-5.27E-09	0	3.44E-05	-6.02E-10	0
143	465077.34	3780921.96	-6.68E-09	0	2.74E-05	-7.63E-10	0
144	465252.08	3780921.96	-8.72E-09	0	8.25E-06	-9.96E-10	0
145	465426.82	3780921.96	-1.19E-08	0	0	-1.35E-09	0
146	465601.56	3780921.96	-1.63E-08	0	4.90E-05	-1.86E-09	0
147	465776.30	3780921.96	-2.31E-08	0	1.39E-04	-2.63E-09	0
148	465951.04	3780921.96	-3.38E-08	0	0	-3.86E-09	0
149	466300.52	3780921.96	-7.81E-08	0	0	-8.92E-09	0
150	467174.22	3780921.96	-8.40E-07	0	0	-9.60E-08	0
151	467348.96	3780921.96	-9.89E-07	0	0	-1.13E-07	0
152	467523.70	3780921.96	-8.91E-07	0	0	-1.02E-07	0
153	467698.44	3780921.96	-6.50E-07	0	0	-7.43E-08	0
154	467873.18	3780921.96	-4.33E-07	0	0	-4.95E-08	0
155	468047.92	3780921.96	-2.85E-07	0	1.13E-04	-3.25E-08	0
156	468222.66	3780921.96	-1.95E-07	0	0	-2.23E-08	0
157	468397.40	3780921.96	-1.39E-07	0	0	-1.59E-08	0
158	464902.60	3781104.64	1.81E-09	3.90E-05	0	1.84E-10	1.41E-05
159	465077.34	3781104.64	1.96E-09	4.23E-05	0	2.00E-10	1.53E-05
160	465252.08	3781104.64	4.20E-10	9.06E-06	0	4.28E-11	3.27E-06
161	465426.82	3781104.64	-6.20E-09	0	0	-7.08E-10	0
162	465601.56	3781104.64	-5.98E-09	0	0	-6.83E-10	0
163	465776.30	3781104.64	-1.53E-08	0	0	-1.75E-09	0
164	465951.04	3781104.64	-2.71E-08	0	1.64E-05	-3.10E-09	0
165	467348.96	3781104.64	-2.65E-06	0	0	-3.03E-07	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
166	467523.70	3781104.64	-2.16E-06	0	0	-2.47E-07	0
167	467698.44	3781104.64	-1.27E-06	0	0	-1.45E-07	0
168	467873.18	3781104.64	-7.09E-07	0	3.92E-04	-8.10E-08	0
169	468047.92	3781104.64	-4.23E-07	0	0	-4.83E-08	0
170	468222.66	3781104.64	-2.65E-07	0	0	-3.03E-08	0
171	468397.40	3781104.64	-1.72E-07	0	0	-1.97E-08	0
172	464902.60	3781287.32	-3.06E-09	0	0	-3.49E-10	0
173	465077.34	3781287.32	1.27E-11	2.74E-07	0	1.30E-12	9.90E-08
174	465252.08	3781287.32	8.28E-10	1.79E-05	0	8.44E-11	6.45E-06
175	465426.82	3781287.32	1.63E-09	3.52E-05	0	1.66E-10	1.27E-05
176	465601.56	3781287.32	8.79E-10	1.90E-05	0	8.96E-11	6.84E-06
177	465776.30	3781287.32	-4.91E-10	0	0	-5.61E-11	0
178	465951.04	3781287.32	-6.92E-09	0	0	-7.90E-10	0
179	467348.96	3781287.32	-1.33E-05	0	0	-1.52E-06	0
180	467523.70	3781287.32	-7.50E-06	0	0	-8.57E-07	0
181	467698.44	3781287.32	-2.75E-06	0	2.71E-04	-3.14E-07	0
182	467873.18	3781287.32	-1.17E-06	0	0	-1.34E-07	0
183	468047.92	3781287.32	-5.62E-07	0	0	-6.42E-08	0
184	468222.66	3781287.32	-2.96E-07	0	0	-3.38E-08	0
185	468397.40	3781287.32	-1.68E-07	0	0	-1.92E-08	0
186	464902.60	3781470.00	-3.70E-08	0	0	-4.22E-09	0
187	465077.34	3781470.00	-3.99E-08	0	0	-4.56E-09	0
188	465252.08	3781470.00	-4.30E-08	0	0	-4.91E-09	0
189	465426.82	3781470.00	-4.03E-08	0	0	-4.60E-09	0
190	465601.56	3781470.00	-4.31E-08	0	0	-4.92E-09	0
191	465776.30	3781470.00	-8.27E-09	0	0	-9.45E-10	0
192	467523.70	3781470.00	-2.09E-05	0	0	-2.38E-06	0
193	467698.44	3781470.00	-2.66E-06	0	0	-3.03E-07	0
194	467873.18	3781470.00	-6.37E-07	0	0	-7.27E-08	0
195	468047.92	3781470.00	-2.04E-07	0	0	-2.33E-08	0
196	468222.66	3781470.00	-7.70E-08	0	0	-8.79E-09	0
197	468397.40	3781470.00	-3.10E-08	0	0	-3.54E-09	0
198	464902.60	3781652.68	-8.83E-08	0	0	-1.01E-08	0
199	465077.34	3781652.68	-1.06E-07	0	0	-1.21E-08	0
200	465252.08	3781652.68	-1.28E-07	0	0	-1.46E-08	0
201	465426.82	3781652.68	-1.52E-07	0	0	-1.74E-08	0
202	465601.56	3781652.68	-1.86E-07	0	0	-2.13E-08	0
203	465776.30	3781652.68	-1.96E-07	0	0	-2.24E-08	0
204	465951.04	3781652.68	-2.74E-07	0	0	-3.13E-08	0
205	466475.26	3781652.68	-1.80E-07	0	0	-2.05E-08	0
206	467523.70	3781652.68	2.71E-05	5.84E-01	4.55E-03	2.76E-06	2.11E-01
207	467698.44	3781652.68	4.34E-06	9.35E-02	3.17E-03	4.42E-07	3.38E-02
208	467873.18	3781652.68	1.43E-06	3.08E-02	1.10E-04	1.45E-07	1.11E-02
209	468047.92	3781652.68	6.26E-07	1.35E-02	7.44E-04	6.38E-08	4.87E-03
210	468222.66	3781652.68	3.25E-07	7.01E-03	4.63E-04	3.32E-08	2.53E-03
211	468397.40	3781652.68	1.90E-07	4.09E-03	3.08E-04	1.94E-08	1.48E-03
212	464902.60	3781835.36	-1.38E-07	0	0	-1.57E-08	0
213	465077.34	3781835.36	-1.65E-07	0	0	-1.88E-08	0
214	465252.08	3781835.36	-1.91E-07	0	0	-2.18E-08	0
215	465426.82	3781835.36	-2.20E-07	0	0	-2.51E-08	0
216	465601.56	3781835.36	-2.54E-07	0	0	-2.90E-08	0
217	465776.30	3781835.36	-2.76E-07	0	0	-3.15E-08	0
218	467348.96	3781835.36	1.29E-05	2.77E-01	1.05E-02	1.31E-06	1.00E-01
219	467523.70	3781835.36	7.21E-06	1.56E-01	1.28E-02	7.35E-07	5.61E-02
220	467698.44	3781835.36	2.47E-06	5.31E-02	0	2.51E-07	1.92E-02

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
221	467873.18	3781835.36	1.09E-06	2.35E-02	1.81E-03	1.11E-07	8.50E-03
222	468047.92	3781835.36	5.63E-07	1.21E-02	7.31E-04	5.74E-08	4.38E-03
223	468222.66	3781835.36	3.30E-07	7.12E-03	0	3.37E-08	2.57E-03
224	468397.40	3781835.36	2.11E-07	4.56E-03	0	2.15E-08	1.64E-03
225	464902.60	3782018.04	-1.16E-07	0	0	-1.32E-08	0
226	465077.34	3782018.04	-1.18E-07	0	0	-1.35E-08	0
227	465252.08	3782018.04	-1.13E-07	0	0	-1.29E-08	0
228	465426.82	3782018.04	-9.61E-08	0	0	-1.10E-08	0
229	465601.56	3782018.04	-5.73E-08	0	0	-6.54E-09	0
230	465776.30	3782018.04	-8.50E-09	0	0	-9.71E-10	0
231	465951.04	3782018.04	1.46E-07	3.14E-03	0	1.48E-08	1.13E-03
232	466475.26	3782018.04	3.78E-07	8.14E-03	0	3.85E-08	2.94E-03
233	467348.96	3782018.04	2.80E-06	6.04E-02	1.27E-03	2.86E-07	2.18E-02
234	467523.70	3782018.04	2.29E-06	4.93E-02	2.22E-03	2.33E-07	1.78E-02
235	467698.44	3782018.04	1.33E-06	2.86E-02	3.17E-03	1.35E-07	1.03E-02
236	467873.18	3782018.04	7.33E-07	1.58E-02	0	7.47E-08	5.71E-03
237	468047.92	3782018.04	3.90E-07	8.42E-03	0	3.98E-08	3.04E-03
238	468222.66	3782018.04	2.34E-07	5.04E-03	5.38E-04	2.38E-08	1.82E-03
239	468397.40	3782018.04	1.57E-07	3.38E-03	5.54E-04	1.60E-08	1.22E-03
240	464902.60	3782200.72	-1.52E-08	0	4.19E-05	-1.73E-09	0
241	465077.34	3782200.72	1.61E-08	3.47E-04	3.72E-06	1.64E-09	1.25E-04
242	465252.08	3782200.72	6.82E-08	1.47E-03	0	6.95E-09	5.31E-04
243	465426.82	3782200.72	1.36E-07	2.92E-03	0	1.38E-08	1.05E-03
244	465601.56	3782200.72	2.19E-07	4.71E-03	0	2.23E-08	1.70E-03
245	465776.30	3782200.72	3.11E-07	6.71E-03	1.80E-04	3.17E-08	2.42E-03
246	465951.04	3782200.72	4.27E-07	9.20E-03	0	4.35E-08	3.32E-03
247	467174.22	3782200.72	9.14E-07	1.97E-02	0	9.31E-08	7.11E-03
248	467348.96	3782200.72	1.08E-06	2.32E-02	4.13E-04	1.10E-07	8.37E-03
249	467523.70	3782200.72	9.64E-07	2.08E-02	3.14E-04	9.83E-08	7.50E-03
250	467698.44	3782200.72	7.14E-07	1.54E-02	0	7.27E-08	5.55E-03
251	467873.18	3782200.72	5.07E-07	1.09E-02	1.76E-04	5.17E-08	3.95E-03
252	468047.92	3782200.72	3.08E-07	6.64E-03	1.85E-04	3.14E-08	2.40E-03
253	468222.66	3782200.72	2.08E-07	4.48E-03	0	2.12E-08	1.62E-03
254	468397.40	3782200.72	1.23E-07	2.65E-03	0	1.25E-08	9.58E-04
255	464902.60	3782383.40	1.01E-07	2.18E-03	0	1.03E-08	7.88E-04
256	465077.34	3782383.40	1.47E-07	3.18E-03	0	1.50E-08	1.15E-03
257	465252.08	3782383.40	2.01E-07	4.32E-03	5.43E-05	2.04E-08	1.56E-03
258	465426.82	3782383.40	2.48E-07	5.34E-03	2.39E-04	2.52E-08	1.93E-03
259	465601.56	3782383.40	2.90E-07	6.25E-03	4.59E-05	2.96E-08	2.26E-03
260	465776.30	3782383.40	3.24E-07	6.98E-03	0	3.30E-08	2.52E-03
261	465951.04	3782383.40	3.27E-07	7.05E-03	3.72E-05	3.33E-08	2.55E-03
262	466999.48	3782383.40	3.52E-07	7.59E-03	6.67E-04	3.59E-08	2.74E-03
263	467174.22	3782383.40	4.27E-07	9.20E-03	1.37E-03	4.35E-08	3.32E-03
264	467348.96	3782383.40	5.68E-07	1.23E-02	4.39E-04	5.79E-08	4.42E-03
265	467523.70	3782383.40	5.29E-07	1.14E-02	3.13E-05	5.39E-08	4.11E-03
266	467698.44	3782383.40	4.38E-07	9.44E-03	8.47E-04	4.46E-08	3.41E-03
267	467873.18	3782383.40	3.26E-07	7.02E-03	1.05E-04	3.32E-08	2.53E-03
268	468047.92	3782383.40	2.25E-07	4.84E-03	0	2.29E-08	1.75E-03
269	468222.66	3782383.40	1.67E-07	3.60E-03	2.58E-04	1.70E-08	1.30E-03
270	468397.40	3782383.40	1.18E-07	2.53E-03	0	1.20E-08	9.15E-04
271	464902.60	3782566.08	1.46E-07	3.15E-03	1.57E-05	1.49E-08	1.14E-03
272	465077.34	3782566.08	1.72E-07	3.70E-03	1.96E-04	1.75E-08	1.34E-03
273	465252.08	3782566.08	1.95E-07	4.19E-03	2.88E-05	1.98E-08	1.51E-03
274	465426.82	3782566.08	2.09E-07	4.50E-03	0	2.13E-08	1.62E-03
275	465601.56	3782566.08	2.12E-07	4.56E-03	1.80E-04	2.16E-08	1.65E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
276	465776.30	3782566.08	1.93E-07	4.16E-03	0	1.96E-08	1.50E-03
277	465951.04	3782566.08	1.50E-07	3.23E-03	3.71E-04	1.53E-08	1.17E-03
278	466125.78	3782566.08	1.08E-07	2.33E-03	0	1.10E-08	8.41E-04
279	466300.52	3782566.08	9.80E-08	2.11E-03	5.47E-04	9.99E-09	7.63E-04
280	466475.26	3782566.08	1.09E-07	2.34E-03	0	1.11E-08	8.45E-04
281	466824.74	3782566.08	1.74E-07	3.75E-03	2.03E-04	1.77E-08	1.35E-03
282	466999.48	3782566.08	2.25E-07	4.86E-03	9.94E-04	2.30E-08	1.75E-03
283	467174.22	3782566.08	2.63E-07	5.67E-03	3.02E-04	2.68E-08	2.05E-03
284	467348.96	3782566.08	2.88E-07	6.20E-03	4.06E-04	2.93E-08	2.24E-03
285	467523.70	3782566.08	2.89E-07	6.22E-03	3.40E-04	2.94E-08	2.25E-03
286	467698.44	3782566.08	2.25E-07	4.86E-03	3.67E-04	2.30E-08	1.75E-03
287	467873.18	3782566.08	2.29E-07	4.93E-03	1.16E-05	2.33E-08	1.78E-03
288	468047.92	3782566.08	1.88E-07	4.05E-03	0	1.91E-08	1.46E-03
289	468222.66	3782566.08	1.32E-07	2.84E-03	0	1.34E-08	1.02E-03
290	468397.40	3782566.08	1.02E-07	2.21E-03	1.41E-04	1.04E-08	7.96E-04
291	464902.60	3782748.76	1.37E-07	2.96E-03	1.08E-04	1.40E-08	1.07E-03
292	465077.34	3782748.76	1.43E-07	3.09E-03	0	1.46E-08	1.12E-03
293	465252.08	3782748.76	1.42E-07	3.06E-03	3.59E-04	1.45E-08	1.10E-03
294	465426.82	3782748.76	1.33E-07	2.87E-03	0	1.36E-08	1.04E-03
295	465601.56	3782748.76	1.11E-07	2.39E-03	2.21E-04	1.13E-08	8.62E-04
296	465776.30	3782748.76	8.01E-08	1.73E-03	1.65E-04	8.16E-09	6.23E-04
297	465951.04	3782748.76	6.06E-08	1.31E-03	8.71E-05	6.18E-09	4.72E-04
298	466125.78	3782748.76	6.39E-08	1.38E-03	3.75E-04	6.51E-09	4.97E-04
299	466300.52	3782748.76	6.97E-08	1.50E-03	0	7.11E-09	5.43E-04
300	466475.26	3782748.76	7.89E-08	1.70E-03	1.80E-04	8.04E-09	6.14E-04
301	466650.00	3782748.76	1.03E-07	2.22E-03	6.19E-04	1.05E-08	8.00E-04
302	466824.74	3782748.76	1.14E-07	2.46E-03	5.15E-04	1.16E-08	8.87E-04
303	466999.48	3782748.76	1.37E-07	2.96E-03	0	1.40E-08	1.07E-03
304	467174.22	3782748.76	1.60E-07	3.46E-03	7.15E-04	1.63E-08	1.25E-03
305	467348.96	3782748.76	1.61E-07	3.46E-03	5.16E-04	1.64E-08	1.25E-03
306	467523.70	3782748.76	1.61E-07	3.47E-03	6.45E-04	1.64E-08	1.25E-03
307	467698.44	3782748.76	1.54E-07	3.31E-03	6.94E-04	1.56E-08	1.19E-03
308	467873.18	3782748.76	1.47E-07	3.17E-03	2.89E-04	1.50E-08	1.14E-03
309	468047.92	3782748.76	1.39E-07	2.99E-03	8.88E-05	1.42E-08	1.08E-03
310	468222.66	3782748.76	8.13E-08	1.75E-03	1.91E-04	8.28E-09	6.32E-04
311	468397.40	3782748.76	7.98E-08	1.72E-03	0	8.13E-09	6.21E-04
312	464902.60	3782931.44	1.08E-07	2.33E-03	1.70E-04	1.10E-08	8.41E-04
313	465077.34	3782931.44	1.04E-07	2.24E-03	4.97E-05	1.06E-08	8.08E-04
314	465252.08	3782931.44	8.96E-08	1.93E-03	0	9.13E-09	6.97E-04
315	465426.82	3782931.44	6.79E-08	1.46E-03	1.99E-04	6.92E-09	5.29E-04
316	465601.56	3782931.44	4.78E-08	1.03E-03	0	4.87E-09	3.72E-04
317	465776.30	3782931.44	3.97E-08	8.56E-04	2.84E-04	4.05E-09	3.09E-04
318	465951.04	3782931.44	4.48E-08	9.65E-04	1.66E-04	4.56E-09	3.48E-04
319	466125.78	3782931.44	4.78E-08	1.03E-03	0	4.88E-09	3.72E-04
320	466300.52	3782931.44	4.71E-08	1.02E-03	1.56E-04	4.80E-09	3.67E-04
321	466475.26	3782931.44	6.63E-08	1.43E-03	5.90E-05	6.75E-09	5.16E-04
322	466650.00	3782931.44	7.44E-08	1.60E-03	1.49E-04	7.58E-09	5.79E-04
323	466824.74	3782931.44	7.43E-08	1.60E-03	4.36E-04	7.57E-09	5.78E-04
324	466999.48	3782931.44	8.09E-08	1.74E-03	4.67E-04	8.24E-09	6.30E-04
325	467174.22	3782931.44	8.64E-08	1.86E-03	4.57E-04	8.80E-09	6.72E-04
326	467348.96	3782931.44	9.89E-08	2.13E-03	5.02E-04	1.01E-08	7.70E-04
327	467523.70	3782931.44	1.05E-07	2.25E-03	1.89E-04	1.07E-08	8.13E-04
328	467698.44	3782931.44	9.80E-08	2.11E-03	0	9.99E-09	7.63E-04
329	467873.18	3782931.44	8.74E-08	1.88E-03	5.20E-04	8.91E-09	6.80E-04
330	468047.92	3782931.44	8.55E-08	1.84E-03	0	8.72E-09	6.66E-04

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
331	468222.66	3782931.44	8.67E-08	1.87E-03	5.57E-06	8.84E-09	6.75E-04
332	468397.40	3782931.44	8.37E-08	1.80E-03	0	8.53E-09	6.51E-04
333	464902.60	3783114.12	7.31E-08	1.58E-03	0	7.45E-09	5.69E-04
334	465077.34	3783114.12	5.95E-08	1.28E-03	2.61E-04	6.06E-09	4.63E-04
335	465252.08	3783114.12	4.31E-08	9.28E-04	0	4.39E-09	3.35E-04
336	465426.82	3783114.12	3.05E-08	6.58E-04	6.39E-05	3.11E-09	2.38E-04
337	465601.56	3783114.12	2.91E-08	6.27E-04	1.89E-04	2.96E-09	2.26E-04
338	465776.30	3783114.12	3.60E-08	7.76E-04	1.53E-04	3.67E-09	2.80E-04
339	465951.04	3783114.12	3.58E-08	7.72E-04	3.77E-05	3.65E-09	2.79E-04
340	466125.78	3783114.12	3.18E-08	6.86E-04	2.79E-04	3.24E-09	2.48E-04
341	466300.52	3783114.12	4.44E-08	9.57E-04	2.15E-04	4.53E-09	3.46E-04
342	466475.26	3783114.12	5.31E-08	1.14E-03	2.99E-04	5.41E-09	4.13E-04
343	466650.00	3783114.12	5.35E-08	1.15E-03	4.88E-04	5.45E-09	4.16E-04
344	466824.74	3783114.12	5.61E-08	1.21E-03	8.67E-04	5.72E-09	4.37E-04
345	466999.48	3783114.12	6.35E-08	1.37E-03	1.96E-04	6.47E-09	4.94E-04
346	467174.22	3783114.12	6.79E-08	1.46E-03	2.02E-04	6.92E-09	5.28E-04
347	467348.96	3783114.12	7.06E-08	1.52E-03	3.66E-04	7.20E-09	5.50E-04
348	467523.70	3783114.12	6.99E-08	1.51E-03	2.29E-04	7.12E-09	5.44E-04
349	467698.44	3783114.12	6.34E-08	1.37E-03	0	6.46E-09	4.94E-04
350	467873.18	3783114.12	6.55E-08	1.41E-03	1.87E-04	6.68E-09	5.10E-04
351	468047.92	3783114.12	6.42E-08	1.38E-03	1.93E-04	6.54E-09	5.00E-04
352	468222.66	3783114.12	6.13E-08	1.32E-03	8.87E-05	6.25E-09	4.77E-04
353	468397.40	3783114.12	5.88E-08	1.27E-03	0	6.00E-09	4.58E-04
354	464902.60	3783296.80	3.90E-08	8.41E-04	2.55E-04	3.97E-09	3.04E-04
355	465077.34	3783296.80	2.78E-08	5.99E-04	0	2.83E-09	2.16E-04
356	465252.08	3783296.80	2.11E-08	4.55E-04	5.71E-05	2.15E-09	1.64E-04
357	465426.82	3783296.80	2.27E-08	4.90E-04	1.73E-04	2.32E-09	1.77E-04
358	465601.56	3783296.80	2.82E-08	6.08E-04	2.20E-04	2.87E-09	2.19E-04
359	465776.30	3783296.80	2.76E-08	5.94E-04	1.85E-05	2.81E-09	2.14E-04
360	465951.04	3783296.80	2.24E-08	4.84E-04	2.40E-04	2.29E-09	1.75E-04
361	466125.78	3783296.80	3.03E-08	6.53E-04	2.90E-04	3.09E-09	2.36E-04
362	466300.52	3783296.80	3.99E-08	8.60E-04	2.88E-04	4.07E-09	3.11E-04
363	466475.26	3783296.80	4.02E-08	8.67E-04	2.88E-04	4.10E-09	3.13E-04
364	466650.00	3783296.80	4.20E-08	9.06E-04	3.51E-05	4.28E-09	3.27E-04
365	466824.74	3783296.80	4.06E-08	8.75E-04	2.00E-04	4.14E-09	3.16E-04
366	466999.48	3783296.80	4.88E-08	1.05E-03	2.29E-04	4.97E-09	3.80E-04
367	467174.22	3783296.80	5.09E-08	1.10E-03	1.09E-04	5.19E-09	3.96E-04
368	467348.96	3783296.80	5.21E-08	1.12E-03	2.49E-04	5.31E-09	4.05E-04
369	467523.70	3783296.80	5.28E-08	1.14E-03	2.21E-04	5.39E-09	4.11E-04
370	467698.44	3783296.80	5.00E-08	1.08E-03	1.04E-04	5.09E-09	3.89E-04
371	467873.18	3783296.80	4.54E-08	9.79E-04	1.71E-04	4.63E-09	3.53E-04
372	468047.92	3783296.80	4.45E-08	9.60E-04	6.55E-04	4.54E-09	3.46E-04
373	468222.66	3783296.80	4.25E-08	9.16E-04	0	4.33E-09	3.31E-04
374	468397.40	3783296.80	4.11E-08	8.85E-04	8.41E-05	4.18E-09	3.20E-04
375	466581.10	3780311.10	-8.52E-08	0	0	4.48E-07	3.42E-02
376	466685.20	3780432.20	-1.17E-07	0	0	3.97E-07	3.03E-02
377	466719.30	3780480.30	-1.32E-07	0	0	1.16E-07	8.88E-03
378	466742.40	3780497.40	-1.40E-07	0	1.21E-05	7.33E-08	5.60E-03
379	466774.50	3780561.50	-1.65E-07	0	7.75E-06	4.79E-08	3.66E-03
380	466839.60	3780632.60	-2.10E-07	0	3.64E-05	1.78E-08	1.36E-03
381	466975.70	3780632.70	-2.57E-07	0	0	9.39E-09	7.17E-04
382	466986.80	3780686.80	-2.99E-07	0	0	8.74E-09	6.67E-04
383	466990.90	3780728.90	-3.34E-07	0	0	5.42E-09	4.14E-04
384	466993.10	3780762.10	-3.66E-07	0	0	-9.74E-09	0
385	467043.11	3780801.11	-4.45E-07	0	0	-1.33E-08	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
386	467079.12	3780812.12	-4.89E-07	0	0	-1.51E-08	0
387	467083.13	3780832.13	-5.24E-07	0	0	-1.60E-08	0
388	467087.14	3780850.14	-5.59E-07	0	0	-1.88E-08	0
389	467104.15	3780876.15	-6.29E-07	0	0	-2.39E-08	0
390	467120.16	3780889.16	-6.77E-07	0	0	-2.94E-08	0
391	467130.17	3780905.17	-7.30E-07	0	0	-3.41E-08	0
392	467142.18	3780917.18	-7.81E-07	0	0	-3.82E-08	0
393	467153.19	3780930.19	-8.37E-07	0	0	-4.18E-08	0
394	467168.20	3780943.20	-9.05E-07	0	0	-5.09E-08	0
395	467181.21	3780957.21	-9.82E-07	0	0	-5.59E-08	0
396	467191.22	3780973.22	-1.07E-06	0	0	-5.99E-08	0
397	467204.23	3780984.23	-1.15E-06	0	0	-6.39E-08	0
398	467216.24	3780997.24	-1.25E-06	0	0	-7.18E-08	0
399	467228.25	3781012.25	-1.37E-06	0	0	-7.73E-08	0
400	467240.26	3781026.26	-1.49E-06	0	0	-8.34E-08	0
401	467253.27	3781039.27	-1.63E-06	0	0	-8.92E-08	0
402	467265.28	3781052.28	-1.78E-06	0	0	-9.56E-08	0
403	467281.29	3781067.29	-1.98E-06	0	0	-1.03E-07	0
404	467293.30	3781085.30	-2.24E-06	0	0	-1.12E-07	0
405	467342.31	3781128.31	-3.10E-06	0	0	-1.22E-07	0
406	467347.32	3781144.32	-3.48E-06	0	0	-1.31E-07	0
407	467364.33	3781166.33	-4.14E-06	0	0	-1.42E-07	0
408	467376.34	3781178.34	-4.55E-06	0	0	-1.56E-07	0
409	467391.35	3781191.35	-5.03E-06	0	0	-1.71E-07	0
410	467399.36	3781206.36	-5.68E-06	0	0	-1.86E-07	0
411	467429.37	3781233.37	-6.90E-06	0	0	-2.03E-07	0
412	467453.38	3781261.38	-8.37E-06	0	0	-2.26E-07	0
413	467476.39	3781293.39	-1.03E-05	0	0	-2.56E-07	0
414	467504.40	3781320.40	-1.13E-05	0	0	-3.54E-07	0
415	467529.41	3781348.41	-1.20E-05	0	0	-3.98E-07	0
416	467556.42	3781377.42	-1.18E-05	0	0	-4.72E-07	0
417	467582.43	3781403.43	-1.04E-05	0	0	-5.19E-07	0
418	467613.44	3781428.44	-7.81E-06	0	0	-5.74E-07	0
419	467701.45	3781546.45	7.19E-07	1.55E-02	0	-6.49E-07	0
420	467519.46	3781907.46	4.39E-06	9.47E-02	3.25E-03	-7.88E-07	0
421	467382.47	3781967.47	3.90E-06	8.40E-02	1.26E-03	-8.92E-07	0
422	467213.48	3782162.48	1.14E-06	2.46E-02	1.29E-03	-9.56E-07	0
423	467117.49	3782332.49	4.70E-07	1.01E-02	2.27E-04	-1.18E-06	0
424	466887.50	3782624.50	1.75E-07	3.76E-03	3.95E-04	-1.18E-06	0
425	466436.51	3782665.51	8.57E-08	1.85E-03	4.72E-04	-1.29E-06	0
426	466309.52	3782600.52	9.21E-08	1.99E-03	5.39E-04	-1.34E-06	0
427	466095.53	3782873.53	5.31E-08	1.15E-03	4.15E-04	-1.37E-06	0
428	465900.00	3780360.00	-3.23E-08	0	0	-3.69E-09	0
429	465950.00	3780360.00	-3.49E-08	0	0	-3.99E-09	0
430	466000.00	3780360.00	-3.78E-08	0	0	-4.32E-09	0
431	466050.00	3780360.00	-4.09E-08	0	0	-4.68E-09	0
432	466100.00	3780360.00	-4.43E-08	0	0	-5.06E-09	0
433	466150.00	3780360.00	-4.80E-08	0	9.34E-06	-5.48E-09	0
434	466200.00	3780360.00	-5.19E-08	0	1.09E-04	-5.93E-09	0
435	466250.00	3780360.00	-5.60E-08	0	2.01E-04	-6.40E-09	0
436	466300.00	3780360.00	-6.05E-08	0	1.16E-04	-6.91E-09	0
437	466350.00	3780360.00	-6.55E-08	0	0	-7.48E-09	0
438	466400.00	3780360.00	-7.08E-08	0	0	-8.09E-09	0
439	466550.00	3780360.00	-8.75E-08	0	0	-1.00E-08	0
440	466600.00	3780360.00	-9.35E-08	0	0	-1.07E-08	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
441	466650.00	3780360.00	-9.96E-08	0	0	-1.14E-08	0
442	466700.00	3780360.00	-1.06E-07	0	2.16E-06	-1.21E-08	0
443	466750.00	3780360.00	-1.12E-07	0	0	-1.28E-08	0
444	466800.00	3780360.00	-1.19E-07	0	0	-1.36E-08	0
445	466850.00	3780360.00	-1.26E-07	0	0	-1.43E-08	0
446	466900.00	3780360.00	-1.32E-07	0	0	-1.51E-08	0
447	466950.00	3780360.00	-1.38E-07	0	1.05E-05	-1.58E-08	0
448	467000.00	3780360.00	-1.45E-07	0	0	-1.65E-08	0
449	467050.00	3780360.00	-1.50E-07	0	0	-1.72E-08	0
450	467100.00	3780360.00	-1.56E-07	0	0	-1.78E-08	0
451	467150.00	3780360.00	-1.60E-07	0	0	-1.83E-08	0
452	467200.00	3780360.00	-1.64E-07	0	0	-1.87E-08	0
453	467250.00	3780360.00	-1.66E-07	0	0	-1.90E-08	0
454	467300.00	3780360.00	-1.68E-07	0	0	-1.92E-08	0
455	467350.00	3780360.00	-1.69E-07	0	0	-1.93E-08	0
456	467400.00	3780360.00	-1.69E-07	0	0	-1.92E-08	0
457	467450.00	3780360.00	-1.67E-07	0	0	-1.91E-08	0
458	467500.00	3780360.00	-1.65E-07	0	0	-1.88E-08	0
459	465900.00	3780410.00	-3.27E-08	0	0	-3.73E-09	0
460	465950.00	3780410.00	-3.55E-08	0	0	-4.05E-09	0
461	466000.00	3780410.00	-3.85E-08	0	0	-4.40E-09	0
462	466050.00	3780410.00	-4.18E-08	0	0	-4.78E-09	0
463	466100.00	3780410.00	-4.54E-08	0	0	-5.19E-09	0
464	466150.00	3780410.00	-4.94E-08	0	0	-5.64E-09	0
465	466200.00	3780410.00	-5.35E-08	0	3.92E-05	-6.12E-09	0
466	466250.00	3780410.00	-5.81E-08	0	1.42E-04	-6.64E-09	0
467	466300.00	3780410.00	-6.31E-08	0	2.31E-04	-7.21E-09	0
468	466350.00	3780410.00	-6.86E-08	0	1.03E-04	-7.84E-09	0
469	466600.00	3780410.00	-1.00E-07	0	0	-1.15E-08	0
470	466650.00	3780410.00	-1.07E-07	0	0	-1.23E-08	0
471	466700.00	3780410.00	-1.15E-07	0	1.13E-05	-1.31E-08	0
472	466750.00	3780410.00	-1.22E-07	0	0	-1.40E-08	0
473	466800.00	3780410.00	-1.30E-07	0	0	-1.48E-08	0
474	466850.00	3780410.00	-1.38E-07	0	0	-1.57E-08	0
475	466900.00	3780410.00	-1.45E-07	0	0	-1.66E-08	0
476	466950.00	3780410.00	-1.53E-07	0	7.53E-05	-1.75E-08	0
477	467000.00	3780410.00	-1.60E-07	0	0	-1.83E-08	0
478	467050.00	3780410.00	-1.67E-07	0	0	-1.91E-08	0
479	467100.00	3780410.00	-1.74E-07	0	0	-1.98E-08	0
480	467150.00	3780410.00	-1.79E-07	0	0	-2.04E-08	0
481	467200.00	3780410.00	-1.83E-07	0	0	-2.09E-08	0
482	467250.00	3780410.00	-1.87E-07	0	0	-2.13E-08	0
483	467300.00	3780410.00	-1.89E-07	0	0	-2.16E-08	0
484	467350.00	3780410.00	-1.90E-07	0	0	-2.17E-08	0
485	467400.00	3780410.00	-1.89E-07	0	0	-2.16E-08	0
486	467450.00	3780410.00	-1.88E-07	0	0	-2.15E-08	0
487	467500.00	3780410.00	-1.85E-07	0	0	-2.11E-08	0
488	465900.00	3780460.00	-3.30E-08	0	0	-3.77E-09	0
489	465950.00	3780460.00	-3.59E-08	0	0	-4.10E-09	0
490	466000.00	3780460.00	-3.91E-08	0	0	-4.47E-09	0
491	466050.00	3780460.00	-4.26E-08	0	0	-4.87E-09	0
492	466100.00	3780460.00	-4.65E-08	0	0	-5.31E-09	0
493	466150.00	3780460.00	-5.06E-08	0	0	-5.78E-09	0
494	466200.00	3780460.00	-5.52E-08	0	0	-6.30E-09	0
495	466250.00	3780460.00	-6.02E-08	0	6.51E-05	-6.87E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
496	466300.00	3780460.00	-6.56E-08	0	1.74E-04	-7.49E-09	0
497	466350.00	3780460.00	-7.17E-08	0	2.57E-04	-8.19E-09	0
498	466600.00	3780460.00	-1.08E-07	0	0	-1.23E-08	0
499	466650.00	3780460.00	-1.16E-07	0	0	-1.32E-08	0
500	466700.00	3780460.00	-1.24E-07	0	0	-1.42E-08	0
501	466750.00	3780460.00	-1.33E-07	0	1.43E-05	-1.52E-08	0
502	466800.00	3780460.00	-1.42E-07	0	0	-1.62E-08	0
503	466850.00	3780460.00	-1.51E-07	0	0	-1.73E-08	0
504	466900.00	3780460.00	-1.60E-07	0	0	-1.83E-08	0
505	466950.00	3780460.00	-1.69E-07	0	6.57E-05	-1.94E-08	0
506	467000.00	3780460.00	-1.78E-07	0	0	-2.04E-08	0
507	467050.00	3780460.00	-1.87E-07	0	0	-2.13E-08	0
508	467100.00	3780460.00	-1.94E-07	0	0	-2.22E-08	0
509	467150.00	3780460.00	-2.01E-07	0	0	-2.30E-08	0
510	467200.00	3780460.00	-2.07E-07	0	0	-2.36E-08	0
511	467250.00	3780460.00	-2.11E-07	0	0	-2.41E-08	0
512	467300.00	3780460.00	-2.13E-07	0	0	-2.44E-08	0
513	467350.00	3780460.00	-2.15E-07	0	0	-2.45E-08	0
514	467400.00	3780460.00	-2.14E-07	0	0	-2.45E-08	0
515	467450.00	3780460.00	-2.12E-07	0	0	-2.42E-08	0
516	467500.00	3780460.00	-2.09E-07	0	0	-2.38E-08	0
517	465900.00	3780510.00	-3.33E-08	0	0	-3.80E-09	0
518	465950.00	3780510.00	-3.63E-08	0	0	-4.14E-09	0
519	466000.00	3780510.00	-3.96E-08	0	0	-4.52E-09	0
520	466050.00	3780510.00	-4.33E-08	0	0	-4.94E-09	0
521	466100.00	3780510.00	-4.73E-08	0	0	-5.41E-09	0
522	466150.00	3780510.00	-5.18E-08	0	0	-5.91E-09	0
523	466200.00	3780510.00	-5.67E-08	0	0	-6.47E-09	0
524	466250.00	3780510.00	-6.21E-08	0	0	-7.09E-09	0
525	466300.00	3780510.00	-6.80E-08	0	9.44E-05	-7.77E-09	0
526	466350.00	3780510.00	-7.47E-08	0	2.00E-04	-8.53E-09	0
527	466650.00	3780510.00	-1.25E-07	0	0	-1.43E-08	0
528	466700.00	3780510.00	-1.35E-07	0	0	-1.54E-08	0
529	466750.00	3780510.00	-1.45E-07	0	1.59E-05	-1.66E-08	0
530	466800.00	3780510.00	-1.56E-07	0	0	-1.78E-08	0
531	466850.00	3780510.00	-1.67E-07	0	0	-1.90E-08	0
532	466900.00	3780510.00	-1.78E-07	0	0	-2.03E-08	0
533	466950.00	3780510.00	-1.88E-07	0	0	-2.15E-08	0
534	467000.00	3780510.00	-1.99E-07	0	0	-2.27E-08	0
535	467050.00	3780510.00	-2.09E-07	0	0	-2.39E-08	0
536	467100.00	3780510.00	-2.19E-07	0	0	-2.50E-08	0
537	467150.00	3780510.00	-2.27E-07	0	0	-2.59E-08	0
538	467200.00	3780510.00	-2.34E-07	0	0	-2.67E-08	0
539	467250.00	3780510.00	-2.39E-07	0	0	-2.73E-08	0
540	467300.00	3780510.00	-2.42E-07	0	0	-2.77E-08	0
541	467350.00	3780510.00	-2.44E-07	0	0	-2.79E-08	0
542	467400.00	3780510.00	-2.44E-07	0	0	-2.78E-08	0
543	467450.00	3780510.00	-2.41E-07	0	0	-2.75E-08	0
544	467500.00	3780510.00	-2.37E-07	0	0	-2.70E-08	0
545	465900.00	3780560.00	-3.34E-08	0	0	-3.82E-09	0
546	465950.00	3780560.00	-3.65E-08	0	0	-4.17E-09	0
547	466000.00	3780560.00	-4.00E-08	0	0	-4.56E-09	0
548	466050.00	3780560.00	-4.38E-08	0	0	-5.00E-09	0
549	466100.00	3780560.00	-4.81E-08	0	0	-5.49E-09	0
550	466150.00	3780560.00	-5.28E-08	0	0	-6.03E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
551	466200.00	3780560.00	-5.80E-08	0	0	-6.63E-09	0
552	466250.00	3780560.00	-6.39E-08	0	0	-7.30E-09	0
553	466300.00	3780560.00	-7.03E-08	0	0	-8.03E-09	0
554	466350.00	3780560.00	-7.75E-08	0	1.23E-04	-8.85E-09	0
555	466700.00	3780560.00	-1.46E-07	0	0	-1.67E-08	0
556	466750.00	3780560.00	-1.59E-07	0	0	-1.81E-08	0
557	466800.00	3780560.00	-1.71E-07	0	3.43E-05	-1.95E-08	0
558	466850.00	3780560.00	-1.84E-07	0	0	-2.10E-08	0
559	466900.00	3780560.00	-1.97E-07	0	0	-2.25E-08	0
560	466950.00	3780560.00	-2.10E-07	0	0	-2.40E-08	0
561	467000.00	3780560.00	-2.23E-07	0	8.99E-05	-2.55E-08	0
562	467050.00	3780560.00	-2.36E-07	0	0	-2.69E-08	0
563	467100.00	3780560.00	-2.48E-07	0	0	-2.83E-08	0
564	467150.00	3780560.00	-2.58E-07	0	0	-2.95E-08	0
565	467200.00	3780560.00	-2.67E-07	0	0	-3.04E-08	0
566	467250.00	3780560.00	-2.73E-07	0	0	-3.12E-08	0
567	467300.00	3780560.00	-2.77E-07	0	0	-3.17E-08	0
568	467350.00	3780560.00	-2.79E-07	0	0	-3.19E-08	0
569	467400.00	3780560.00	-2.79E-07	0	0	-3.18E-08	0
570	467450.00	3780560.00	-2.75E-07	0	0	-3.15E-08	0
571	467500.00	3780560.00	-2.70E-07	0	0	-3.08E-08	0
572	465900.00	3780610.00	-3.35E-08	0	0	-3.83E-09	0
573	465950.00	3780610.00	-3.67E-08	0	0	-4.19E-09	0
574	466000.00	3780610.00	-4.02E-08	0	0	-4.60E-09	0
575	466050.00	3780610.00	-4.42E-08	0	0	-5.05E-09	0
576	466100.00	3780610.00	-4.87E-08	0	0	-5.56E-09	0
577	466150.00	3780610.00	-5.37E-08	0	0	-6.13E-09	0
578	466200.00	3780610.00	-5.92E-08	0	0	-6.76E-09	0
579	466250.00	3780610.00	-6.54E-08	0	0	-7.47E-09	0
580	466300.00	3780610.00	-7.24E-08	0	0	-8.27E-09	0
581	466750.00	3780610.00	-1.73E-07	0	0	-1.97E-08	0
582	466800.00	3780610.00	-1.88E-07	0	0	-2.15E-08	0
583	466850.00	3780610.00	-2.03E-07	0	0	-2.32E-08	0
584	466900.00	3780610.00	-2.19E-07	0	0	-2.51E-08	0
585	466950.00	3780610.00	-2.35E-07	0	0	-2.69E-08	0
586	467000.00	3780610.00	-2.51E-07	0	0	-2.87E-08	0
587	467050.00	3780610.00	-2.67E-07	0	0	-3.05E-08	0
588	467100.00	3780610.00	-2.82E-07	0	0	-3.22E-08	0
589	467150.00	3780610.00	-2.95E-07	0	0	-3.37E-08	0
590	467200.00	3780610.00	-3.06E-07	0	0	-3.49E-08	0
591	467250.00	3780610.00	-3.14E-07	0	0	-3.58E-08	0
592	467300.00	3780610.00	-3.20E-07	0	0	-3.65E-08	0
593	467350.00	3780610.00	-3.22E-07	0	0	-3.67E-08	0
594	467400.00	3780610.00	-3.21E-07	0	0	-3.67E-08	0
595	467450.00	3780610.00	-3.17E-07	0	0	-3.62E-08	0
596	467500.00	3780610.00	-3.10E-07	0	0	-3.54E-08	0
597	465900.00	3780660.00	-3.35E-08	0	0	-3.83E-09	0
598	465950.00	3780660.00	-3.68E-08	0	0	-4.20E-09	0
599	466000.00	3780660.00	-4.04E-08	0	0	-4.62E-09	0
600	466050.00	3780660.00	-4.46E-08	0	0	-5.09E-09	0
601	466100.00	3780660.00	-4.92E-08	0	0	-5.62E-09	0
602	466150.00	3780660.00	-5.44E-08	0	0	-6.21E-09	0
603	466200.00	3780660.00	-6.02E-08	0	0	-6.88E-09	0
604	466250.00	3780660.00	-6.68E-08	0	0	-7.63E-09	0
605	466300.00	3780660.00	-7.42E-08	0	0	-8.48E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
606	466800.00	3780660.00	-2.06E-07	0	0	-2.35E-08	0
607	466850.00	3780660.00	-2.26E-07	0	6.76E-05	-2.58E-08	0
608	466900.00	3780660.00	-2.45E-07	0	0	-2.80E-08	0
609	466950.00	3780660.00	-2.65E-07	0	0	-3.02E-08	0
610	467000.00	3780660.00	-2.85E-07	0	0	-3.25E-08	0
611	467050.00	3780660.00	-3.04E-07	0	0	-3.47E-08	0
612	467100.00	3780660.00	-3.22E-07	0	0	-3.68E-08	0
613	467150.00	3780660.00	-3.39E-07	0	0	-3.87E-08	0
614	467200.00	3780660.00	-3.53E-07	0	0	-4.03E-08	0
615	467250.00	3780660.00	-3.64E-07	0	0	-4.16E-08	0
616	467300.00	3780660.00	-3.71E-07	0	0	-4.24E-08	0
617	467350.00	3780660.00	-3.74E-07	0	0	-4.27E-08	0
618	467400.00	3780660.00	-3.73E-07	0	0	-4.26E-08	0
619	467450.00	3780660.00	-3.68E-07	0	0	-4.20E-08	0
620	467500.00	3780660.00	-3.59E-07	0	0	-4.10E-08	0
621	465900.00	3780710.00	-3.33E-08	0	0	-3.81E-09	0
622	465950.00	3780710.00	-3.67E-08	0	0	-4.19E-09	0
623	466000.00	3780710.00	-4.04E-08	0	0	-4.62E-09	0
624	466050.00	3780710.00	-4.47E-08	0	0	-5.11E-09	0
625	466100.00	3780710.00	-4.95E-08	0	0	-5.65E-09	0
626	466150.00	3780710.00	-5.49E-08	0	0	-6.27E-09	0
627	466250.00	3780710.00	-6.79E-08	0	0	-7.75E-09	0
628	466300.00	3780710.00	-7.58E-08	0	0	-8.65E-09	0
629	466850.00	3780710.00	-2.49E-07	0	0	-2.85E-08	0
630	466900.00	3780710.00	-2.74E-07	0	0	-3.13E-08	0
631	466950.00	3780710.00	-2.98E-07	0	0	-3.41E-08	0
632	467000.00	3780710.00	-3.23E-07	0	0	-3.69E-08	0
633	467050.00	3780710.00	-3.48E-07	0	0	-3.97E-08	0
634	467100.00	3780710.00	-3.71E-07	0	0	-4.24E-08	0
635	467150.00	3780710.00	-3.93E-07	0	0	-4.49E-08	0
636	467200.00	3780710.00	-4.11E-07	0	0	-4.69E-08	0
637	467250.00	3780710.00	-4.26E-07	0	0	-4.86E-08	0
638	467300.00	3780710.00	-4.34E-07	0	0	-4.96E-08	0
639	467350.00	3780710.00	-4.39E-07	0	0	-5.01E-08	0
640	467400.00	3780710.00	-4.37E-07	0	0	-4.99E-08	0
641	467450.00	3780710.00	-4.31E-07	0	0	-4.92E-08	0
642	467500.00	3780710.00	-4.20E-07	0	0	-4.79E-08	0
643	465900.00	3780760.00	-3.30E-08	0	0	-3.77E-09	0
644	465950.00	3780760.00	-3.64E-08	0	0	-4.16E-09	0
645	466000.00	3780760.00	-4.03E-08	0	0	-4.61E-09	0
646	466050.00	3780760.00	-4.47E-08	0	0	-5.10E-09	0
647	466100.00	3780760.00	-4.96E-08	0	0	-5.66E-09	0
648	466250.00	3780760.00	-6.86E-08	0	0	-7.84E-09	0
649	466300.00	3780760.00	-7.70E-08	0	0	-8.79E-09	0
650	466900.00	3780760.00	-3.06E-07	0	0	-3.50E-08	0
651	466950.00	3780760.00	-3.38E-07	0	0	-3.86E-08	0
652	467000.00	3780760.00	-3.69E-07	0	0	-4.21E-08	0
653	467050.00	3780760.00	-4.00E-07	0	0	-4.57E-08	0
654	467100.00	3780760.00	-4.30E-07	0	0	-4.91E-08	0
655	467150.00	3780760.00	-4.58E-07	0	0	-5.24E-08	0
656	467200.00	3780760.00	-4.83E-07	0	0	-5.51E-08	0
657	467250.00	3780760.00	-5.03E-07	0	0	-5.74E-08	0
658	467300.00	3780760.00	-5.14E-07	0	0	-5.87E-08	0
659	467350.00	3780760.00	-5.20E-07	0	0	-5.94E-08	0
660	467400.00	3780760.00	-5.18E-07	0	0	-5.92E-08	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
661	467450.00	3780760.00	-5.10E-07	0	0	-5.82E-08	0
662	467500.00	3780760.00	-4.95E-07	0	0	-5.65E-08	0
663	465900.00	3780810.00	-3.24E-08	0	0	-3.70E-09	0
664	465950.00	3780810.00	-3.59E-08	0	0	-4.10E-09	0
665	466000.00	3780810.00	-3.99E-08	0	0	-4.56E-09	0
666	466050.00	3780810.00	-4.44E-08	0	0	-5.07E-09	0
667	466100.00	3780810.00	-4.94E-08	0	0	-5.65E-09	0
668	466250.00	3780810.00	-6.91E-08	0	0	-7.90E-09	0
669	466300.00	3780810.00	-7.78E-08	0	0	-8.89E-09	0
670	466950.00	3780810.00	-3.83E-07	0	0	-4.37E-08	0
671	467000.00	3780810.00	-4.23E-07	0	0	-4.83E-08	0
672	467050.00	3780810.00	-4.63E-07	0	0	-5.29E-08	0
673	467100.00	3780810.00	-5.02E-07	0	0	-5.73E-08	0
674	467150.00	3780810.00	-5.40E-07	0	0	-6.16E-08	0
675	467200.00	3780810.00	-5.73E-07	0	0	-6.54E-08	0
676	467250.00	3780810.00	-6.00E-07	0	0	-6.85E-08	0
677	467300.00	3780810.00	-6.15E-07	0	0	-7.03E-08	0
678	467350.00	3780810.00	-6.24E-07	0	0	-7.13E-08	0
679	467400.00	3780810.00	-6.22E-07	0	0	-7.10E-08	0
680	467450.00	3780810.00	-6.11E-07	0	0	-6.98E-08	0
681	467500.00	3780810.00	-5.91E-07	0	0	-6.75E-08	0
682	465900.00	3780860.00	-3.15E-08	0	0	-3.60E-09	0
683	465950.00	3780860.00	-3.51E-08	0	0	-4.01E-09	0
684	466000.00	3780860.00	-3.92E-08	0	0	-4.47E-09	0
685	466050.00	3780860.00	-4.37E-08	0	0	-4.99E-09	0
686	466100.00	3780860.00	-4.89E-08	0	0	-5.59E-09	0
687	466250.00	3780860.00	-6.93E-08	0	0	-7.91E-09	0
688	466300.00	3780860.00	-7.83E-08	0	0	-8.94E-09	0
689	467000.00	3780860.00	-4.87E-07	0	0	-5.56E-08	0
690	467050.00	3780860.00	-5.40E-07	0	0	-6.17E-08	0
691	467100.00	3780860.00	-5.91E-07	0	0	-6.75E-08	0
692	467150.00	3780860.00	-6.41E-07	0	0	-7.32E-08	0
693	467200.00	3780860.00	-6.87E-07	0	0	-7.84E-08	0
694	467250.00	3780860.00	-7.24E-07	0	0	-8.27E-08	0
695	467300.00	3780860.00	-7.47E-07	0	0	-8.53E-08	0
696	467350.00	3780860.00	-7.60E-07	0	0	-8.69E-08	0
697	467400.00	3780860.00	-7.56E-07	0	0	-8.63E-08	0
698	467450.00	3780860.00	-7.41E-07	0	0	-8.46E-08	0
699	467500.00	3780860.00	-7.12E-07	0	0	-8.13E-08	0
700	465900.00	3780910.00	-3.05E-08	0	1.93E-05	-3.48E-09	0
701	465950.00	3780910.00	-3.40E-08	0	0	-3.89E-09	0
702	466000.00	3780910.00	-3.81E-08	0	0	-4.35E-09	0
703	466050.00	3780910.00	-4.27E-08	0	0	-4.87E-09	0
704	466300.00	3780910.00	-7.81E-08	0	0	-8.92E-09	0
705	466350.00	3780910.00	-8.91E-08	0	0	-1.02E-08	0
706	466400.00	3780910.00	-1.02E-07	0	0	-1.16E-08	0
707	467050.00	3780910.00	-6.32E-07	0	0	-7.22E-08	0
708	467100.00	3780910.00	-7.04E-07	0	0	-8.04E-08	0
709	467150.00	3780910.00	-7.70E-07	0	0	-8.80E-08	0
710	467200.00	3780910.00	-8.33E-07	0	0	-9.52E-08	0
711	467250.00	3780910.00	-8.86E-07	0	0	-1.01E-07	0
712	467300.00	3780910.00	-9.21E-07	0	0	-1.05E-07	0
713	467350.00	3780910.00	-9.38E-07	0	0	-1.07E-07	0
714	467400.00	3780910.00	-9.34E-07	0	0	-1.07E-07	0
715	467450.00	3780910.00	-9.12E-07	0	0	-1.04E-07	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
716	467500.00	3780910.00	-8.70E-07	0	0	-9.94E-08	0
717	465900.00	3780960.00	-2.92E-08	0	1.57E-04	-3.33E-09	0
718	465950.00	3780960.00	-3.27E-08	0	1.38E-04	-3.74E-09	0
719	466000.00	3780960.00	-3.67E-08	0	6.34E-05	-4.19E-09	0
720	466050.00	3780960.00	-4.12E-08	0	0	-4.71E-09	0
721	466300.00	3780960.00	-7.72E-08	0	0	-8.81E-09	0
722	466350.00	3780960.00	-8.86E-08	0	0	-1.01E-08	0
723	466400.00	3780960.00	-1.02E-07	0	0	-1.16E-08	0
724	467050.00	3780960.00	-7.45E-07	0	0	-8.51E-08	0
725	467100.00	3780960.00	-8.43E-07	0	0	-9.63E-08	0
726	467150.00	3780960.00	-9.38E-07	0	0	-1.07E-07	0
727	467200.00	3780960.00	-1.03E-06	0	0	-1.17E-07	0
728	467250.00	3780960.00	-1.10E-06	0	0	-1.26E-07	0
729	467300.00	3780960.00	-1.16E-06	0	0	-1.32E-07	0
730	467350.00	3780960.00	-1.18E-06	0	0	-1.35E-07	0
731	467400.00	3780960.00	-1.18E-06	0	0	-1.34E-07	0
732	467450.00	3780960.00	-1.14E-06	0	0	-1.31E-07	0
733	467500.00	3780960.00	-1.08E-06	0	0	-1.24E-07	0
734	465900.00	3781010.00	-2.76E-08	0	1.52E-04	-3.16E-09	0
735	465950.00	3781010.00	-3.12E-08	0	1.76E-04	-3.56E-09	0
736	466000.00	3781010.00	-3.50E-08	0	1.83E-04	-4.00E-09	0
737	466050.00	3781010.00	-3.94E-08	0	1.70E-04	-4.50E-09	0
738	466300.00	3781010.00	-7.55E-08	0	0	-8.62E-09	0
739	467100.00	3781010.00	-1.02E-06	0	0	-1.16E-07	0
740	467150.00	3781010.00	-1.16E-06	0	0	-1.32E-07	0
741	467200.00	3781010.00	-1.29E-06	0	0	-1.47E-07	0
742	467250.00	3781010.00	-1.40E-06	0	0	-1.60E-07	0
743	467300.00	3781010.00	-1.48E-06	0	0	-1.69E-07	0
744	467350.00	3781010.00	-1.52E-06	0	0	-1.74E-07	0
745	467400.00	3781010.00	-1.51E-06	0	0	-1.73E-07	0
746	467450.00	3781010.00	-1.46E-06	0	0	-1.67E-07	0
747	467500.00	3781010.00	-1.37E-06	0	0	-1.57E-07	0
748	465900.00	3781060.00	-2.60E-08	0	7.42E-05	-2.97E-09	0
749	465950.00	3781060.00	-2.93E-08	0	1.38E-04	-3.35E-09	0
750	466000.00	3781060.00	-3.30E-08	0	1.81E-04	-3.77E-09	0
751	466300.00	3781060.00	-7.27E-08	0	0	-8.31E-09	0
752	466350.00	3781060.00	-8.41E-08	0	0	-9.60E-09	0
753	467150.00	3781060.00	-1.43E-06	0	0	-1.64E-07	0
754	467200.00	3781060.00	-1.64E-06	0	0	-1.88E-07	0
755	467250.00	3781060.00	-1.82E-06	0	0	-2.07E-07	0
756	467300.00	3781060.00	-1.95E-06	0	0	-2.22E-07	0
757	467350.00	3781060.00	-2.01E-06	0	0	-2.30E-07	0
758	467400.00	3781060.00	-2.00E-06	0	0	-2.28E-07	0
759	467450.00	3781060.00	-1.91E-06	0	0	-2.19E-07	0
760	467500.00	3781060.00	-1.77E-06	0	0	-2.02E-07	0
761	465900.00	3781110.00	-2.38E-08	0	8.41E-06	-2.72E-09	0
762	465950.00	3781110.00	-2.68E-08	0	0	-3.06E-09	0
763	466000.00	3781110.00	-3.04E-08	0	7.20E-05	-3.47E-09	0
764	466350.00	3781110.00	-7.87E-08	0	2.67E-05	-8.98E-09	0
765	467200.00	3781110.00	-2.11E-06	0	0	-2.41E-07	0
766	467250.00	3781110.00	-2.42E-06	0	0	-2.77E-07	0
767	467300.00	3781110.00	-2.64E-06	0	0	-3.01E-07	0
768	467350.00	3781110.00	-2.75E-06	0	0	-3.14E-07	0
769	467400.00	3781110.00	-2.73E-06	0	0	-3.12E-07	0
770	467450.00	3781110.00	-2.59E-06	0	0	-2.96E-07	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
771	467500.00	3781110.00	-2.36E-06	0	0	-2.70E-07	0
772	465900.00	3781160.00	-2.17E-08	0	6.46E-05	-2.48E-09	0
773	465950.00	3781160.00	-2.44E-08	0	6.84E-05	-2.79E-09	0
774	466000.00	3781160.00	-2.76E-08	0	4.56E-05	-3.16E-09	0
775	466350.00	3781160.00	-7.39E-08	0	4.13E-04	-8.44E-09	0
776	467250.00	3781160.00	-3.29E-06	0	0	-3.76E-07	0
777	467300.00	3781160.00	-3.74E-06	0	0	-4.27E-07	0
778	467350.00	3781160.00	-3.93E-06	0	0	-4.49E-07	0
779	467400.00	3781160.00	-3.89E-06	0	0	-4.44E-07	0
780	467450.00	3781160.00	-3.64E-06	0	0	-4.15E-07	0
781	467500.00	3781160.00	-3.23E-06	0	0	-3.69E-07	0
782	465900.00	3781210.00	-1.99E-08	0	4.79E-05	-2.27E-09	0
783	465950.00	3781210.00	-2.23E-08	0	5.62E-05	-2.55E-09	0
784	466350.00	3781210.00	-6.80E-08	0	4.74E-04	-7.77E-09	0
785	467300.00	3781210.00	-5.46E-06	0	0	-6.24E-07	0
786	467350.00	3781210.00	-5.98E-06	0	0	-6.83E-07	0
787	467400.00	3781210.00	-5.87E-06	0	0	-6.70E-07	0
788	467450.00	3781210.00	-5.34E-06	0	0	-6.10E-07	0
789	467500.00	3781210.00	-4.58E-06	0	0	-5.24E-07	0
790	465900.00	3781260.00	-9.84E-09	0	0	-1.12E-09	0
791	465950.00	3781260.00	-1.12E-08	0	0	-1.28E-09	0
792	466350.00	3781260.00	-6.14E-08	0	3.00E-04	-7.01E-09	0
793	466400.00	3781260.00	-7.27E-08	0	5.10E-04	-8.30E-09	0
794	467350.00	3781260.00	-9.67E-06	0	0	-1.10E-06	0
795	467400.00	3781260.00	-9.64E-06	0	0	-1.10E-06	0
796	467450.00	3781260.00	-8.37E-06	0	0	-9.56E-07	0
797	467500.00	3781260.00	-6.78E-06	0	0	-7.74E-07	0
798	465900.00	3781310.00	-6.66E-10	0	0	-7.61E-11	0
799	465950.00	3781310.00	-2.90E-09	0	0	-3.32E-10	0
800	466400.00	3781310.00	-3.48E-08	0	0	-3.97E-09	0
801	467400.00	3781310.00	-1.74E-05	0	0	-1.99E-06	0
802	467450.00	3781310.00	-1.44E-05	0	0	-1.64E-06	0
803	467500.00	3781310.00	-1.06E-05	0	0	-1.21E-06	0
804	465900.00	3781360.00	-2.07E-10	0	0	-2.37E-11	0
805	466400.00	3781360.00	-2.23E-08	0	0	-2.55E-09	0
806	467450.00	3781360.00	-2.70E-05	0	0	-3.08E-06	0
807	467500.00	3781360.00	-1.73E-05	0	0	-1.98E-06	0
808	465900.00	3781410.00	-1.54E-09	0	0	-1.76E-10	0
809	467500.00	3781410.00	-2.74E-05	0	0	-3.13E-06	0
810	467500.00	3781460.00	-3.24E-05	0	0	-3.70E-06	0
811	465900.00	3781610.00	-1.75E-07	0	0	-1.99E-08	0
812	465950.00	3781610.00	-1.99E-07	0	0	-2.27E-08	0
813	466000.00	3781610.00	-1.34E-07	0	0	-1.53E-08	0
814	466450.00	3781610.00	-4.67E-08	0	0	-5.34E-09	0
815	465900.00	3781660.00	-1.55E-07	0	0	-1.77E-08	0
816	465950.00	3781660.00	-2.85E-07	0	0	-3.26E-08	0
817	467500.00	3781660.00	3.81E-05	8.22E-01	1.23E-02	3.89E-06	2.97E-01
818	465900.00	3781710.00	-3.09E-07	0	0	-3.53E-08	0
819	465950.00	3781710.00	-3.74E-07	0	0	-4.27E-08	0
820	466500.00	3781710.00	-6.89E-07	0	0	-7.87E-08	0
821	467450.00	3781710.00	5.10E-05	1.10E+00	3.77E-02	5.20E-06	3.97E-01
822	467500.00	3781710.00	2.62E-05	5.64E-01	1.73E-02	2.67E-06	2.04E-01
823	465900.00	3781760.00	-3.34E-07	0	0	-3.81E-08	0
824	466500.00	3781760.00	-5.13E-07	0	0	-5.86E-08	0
825	467400.00	3781760.00	3.50E-05	7.55E-01	1.53E-02	3.57E-06	2.73E-01

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
826	467450.00	3781760.00	2.50E-05	5.39E-01	3.15E-02	2.55E-06	1.95E-01
827	467500.00	3781760.00	1.62E-05	3.49E-01	1.74E-02	1.65E-06	1.26E-01
828	465900.00	3781810.00	-3.21E-07	0	0	-3.67E-08	0
829	466500.00	3781810.00	-2.33E-07	0	0	-2.66E-08	0
830	467400.00	3781810.00	1.70E-05	3.67E-01	7.39E-03	1.74E-06	1.33E-01
831	467450.00	3781810.00	1.39E-05	3.00E-01	1.22E-02	1.42E-06	1.08E-01
832	467500.00	3781810.00	1.03E-05	2.21E-01	1.61E-02	1.05E-06	7.99E-02
833	465900.00	3781860.00	-2.71E-07	0	0	-3.10E-08	0
834	466500.00	3781860.00	7.90E-08	1.70E-03	0	8.05E-09	6.15E-04
835	467350.00	3781860.00	9.93E-06	2.14E-01	7.58E-03	1.01E-06	7.73E-02
836	467400.00	3781860.00	9.80E-06	2.11E-01	3.14E-03	9.99E-07	7.63E-02
837	467450.00	3781860.00	8.58E-06	1.85E-01	4.47E-03	8.75E-07	6.68E-02
838	467500.00	3781860.00	6.85E-06	1.48E-01	9.20E-03	6.98E-07	5.33E-02
839	465900.00	3781910.00	-1.65E-07	0	0	-1.88E-08	0
840	466500.00	3781910.00	4.67E-07	1.01E-02	0	4.76E-08	3.64E-03
841	467300.00	3781910.00	5.68E-06	1.23E-01	2.16E-03	5.79E-07	4.42E-02
842	467350.00	3781910.00	6.05E-06	1.30E-01	3.52E-03	6.17E-07	4.71E-02
843	467400.00	3781910.00	6.25E-06	1.35E-01	1.49E-03	6.37E-07	4.86E-02
844	467450.00	3781910.00	5.55E-06	1.20E-01	1.47E-03	5.66E-07	4.32E-02
845	467500.00	3781910.00	4.66E-06	1.00E-01	4.18E-03	4.75E-07	3.63E-02
846	465900.00	3781960.00	-5.85E-08	0	0	-6.68E-09	0
847	466500.00	3781960.00	7.95E-07	1.71E-02	7.44E-05	8.10E-08	6.19E-03
848	467250.00	3781960.00	3.45E-06	7.43E-02	1.19E-03	3.51E-07	2.68E-02
849	467300.00	3781960.00	3.81E-06	8.21E-02	2.76E-03	3.88E-07	2.96E-02
850	467350.00	3781960.00	4.18E-06	9.00E-02	1.93E-03	4.26E-07	3.25E-02
851	467400.00	3781960.00	4.07E-06	8.77E-02	2.59E-03	4.14E-07	3.17E-02
852	467450.00	3781960.00	3.80E-06	8.20E-02	7.94E-04	3.88E-07	2.96E-02
853	467500.00	3781960.00	3.37E-06	7.27E-02	3.40E-03	3.44E-07	2.63E-02
854	465900.00	3782010.00	7.04E-08	1.52E-03	0	7.18E-09	5.48E-04
855	465950.00	3782010.00	1.21E-07	2.62E-03	0	1.24E-08	9.45E-04
856	466500.00	3782010.00	9.73E-07	2.10E-02	0	9.91E-08	7.57E-03
857	467250.00	3782010.00	2.47E-06	5.32E-02	6.61E-04	2.52E-07	1.92E-02
858	467300.00	3782010.00	2.81E-06	6.07E-02	1.19E-03	2.87E-07	2.19E-02
859	467350.00	3782010.00	2.95E-06	6.37E-02	1.26E-03	3.01E-07	2.30E-02
860	467400.00	3782010.00	2.92E-06	6.29E-02	1.79E-03	2.98E-07	2.27E-02
861	467450.00	3782010.00	2.78E-06	6.00E-02	5.30E-04	2.84E-07	2.17E-02
862	467500.00	3782010.00	2.53E-06	5.45E-02	2.04E-03	2.58E-07	1.97E-02
863	465900.00	3782060.00	2.03E-07	4.38E-03	0	2.07E-08	1.58E-03
864	465950.00	3782060.00	2.85E-07	6.14E-03	0	2.90E-08	2.22E-03
865	466500.00	3782060.00	8.85E-07	1.91E-02	0	9.02E-08	6.89E-03
866	467200.00	3782060.00	1.70E-06	3.65E-02	1.22E-03	1.73E-07	1.32E-02
867	467250.00	3782060.00	1.91E-06	4.11E-02	9.04E-04	1.94E-07	1.48E-02
868	467300.00	3782060.00	2.10E-06	4.53E-02	8.62E-04	2.14E-07	1.64E-02
869	467350.00	3782060.00	2.18E-06	4.70E-02	9.86E-04	2.22E-07	1.70E-02
870	467400.00	3782060.00	2.18E-06	4.71E-02	1.02E-03	2.23E-07	1.70E-02
871	467450.00	3782060.00	2.09E-06	4.51E-02	5.17E-04	2.13E-07	1.63E-02
872	467500.00	3782060.00	1.95E-06	4.20E-02	4.85E-04	1.98E-07	1.52E-02
873	465900.00	3782110.00	3.07E-07	6.61E-03	0	3.13E-08	2.39E-03
874	465950.00	3782110.00	3.86E-07	8.32E-03	7.96E-05	3.93E-08	3.00E-03
875	467150.00	3782110.00	1.24E-06	2.67E-02	1.77E-03	1.26E-07	9.63E-03
876	467200.00	3782110.00	1.38E-06	2.96E-02	1.08E-04	1.40E-07	1.07E-02
877	467250.00	3782110.00	1.48E-06	3.18E-02	1.36E-03	1.51E-07	1.15E-02
878	467300.00	3782110.00	1.62E-06	3.49E-02	7.73E-04	1.65E-07	1.26E-02
879	467350.00	3782110.00	1.67E-06	3.59E-02	7.19E-04	1.70E-07	1.30E-02
880	467400.00	3782110.00	1.67E-06	3.60E-02	7.49E-04	1.70E-07	1.30E-02

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
881	467450.00	3782110.00	1.61E-06	3.48E-02	6.15E-04	1.64E-07	1.26E-02
882	467500.00	3782110.00	1.53E-06	3.30E-02	0	1.56E-07	1.19E-02
883	465900.00	3782160.00	3.73E-07	8.05E-03	3.09E-04	3.80E-08	2.91E-03
884	465950.00	3782160.00	4.11E-07	8.85E-03	2.63E-04	4.18E-08	3.20E-03
885	466450.00	3782160.00	4.50E-07	9.70E-03	0	4.59E-08	3.50E-03
886	467100.00	3782160.00	9.09E-07	1.96E-02	8.19E-04	9.26E-08	7.07E-03
887	467150.00	3782160.00	1.00E-06	2.16E-02	1.02E-03	1.02E-07	7.78E-03
888	467200.00	3782160.00	1.13E-06	2.44E-02	5.01E-04	1.15E-07	8.82E-03
889	467250.00	3782160.00	1.20E-06	2.59E-02	1.60E-03	1.23E-07	9.36E-03
890	467300.00	3782160.00	1.26E-06	2.72E-02	7.85E-04	1.29E-07	9.83E-03
891	467350.00	3782160.00	1.30E-06	2.80E-02	4.67E-04	1.32E-07	1.01E-02
892	467400.00	3782160.00	1.30E-06	2.81E-02	5.53E-04	1.33E-07	1.01E-02
893	467450.00	3782160.00	1.27E-06	2.74E-02	7.22E-04	1.29E-07	9.88E-03
894	467500.00	3782160.00	1.20E-06	2.60E-02	0	1.23E-07	9.37E-03
895	465900.00	3782210.00	4.05E-07	8.72E-03	1.04E-04	4.12E-08	3.15E-03
896	465950.00	3782210.00	4.27E-07	9.21E-03	0	4.35E-08	3.32E-03
897	466000.00	3782210.00	4.63E-07	9.98E-03	0	4.72E-08	3.60E-03
898	466450.00	3782210.00	4.20E-07	9.04E-03	4.95E-04	4.28E-08	3.27E-03
899	467050.00	3782210.00	6.67E-07	1.44E-02	6.18E-04	6.79E-08	5.19E-03
900	467100.00	3782210.00	7.29E-07	1.57E-02	1.32E-03	7.43E-08	5.67E-03
901	467150.00	3782210.00	8.39E-07	1.81E-02	6.49E-05	8.55E-08	6.53E-03
902	467200.00	3782210.00	9.10E-07	1.96E-02	1.13E-03	9.28E-08	7.09E-03
903	467250.00	3782210.00	9.95E-07	2.14E-02	1.58E-03	1.01E-07	7.74E-03
904	467300.00	3782210.00	1.01E-06	2.17E-02	9.94E-04	1.03E-07	7.84E-03
905	467350.00	3782210.00	1.03E-06	2.23E-02	4.09E-04	1.05E-07	8.04E-03
906	467400.00	3782210.00	1.03E-06	2.23E-02	3.23E-04	1.05E-07	8.05E-03
907	467450.00	3782210.00	1.01E-06	2.17E-02	7.97E-04	1.02E-07	7.83E-03
908	467500.00	3782210.00	9.61E-07	2.07E-02	5.39E-05	9.80E-08	7.48E-03
909	465900.00	3782260.00	4.07E-07	8.77E-03	0	4.15E-08	3.17E-03
910	465950.00	3782260.00	4.22E-07	9.09E-03	6.33E-05	4.30E-08	3.28E-03
911	466000.00	3782260.00	4.55E-07	9.81E-03	9.78E-05	4.64E-08	3.54E-03
912	466450.00	3782260.00	3.36E-07	7.25E-03	4.44E-04	3.43E-08	2.62E-03
913	467050.00	3782260.00	5.55E-07	1.20E-02	7.89E-04	5.66E-08	4.32E-03
914	467100.00	3782260.00	6.32E-07	1.36E-02	1.20E-03	6.44E-08	4.92E-03
915	467150.00	3782260.00	6.98E-07	1.51E-02	0	7.12E-08	5.43E-03
916	467200.00	3782260.00	7.56E-07	1.63E-02	1.40E-03	7.71E-08	5.89E-03
917	467250.00	3782260.00	8.21E-07	1.77E-02	1.24E-03	8.37E-08	6.39E-03
918	467300.00	3782260.00	8.47E-07	1.83E-02	9.95E-04	8.63E-08	6.59E-03
919	467350.00	3782260.00	8.36E-07	1.80E-02	3.98E-04	8.52E-08	6.50E-03
920	467400.00	3782260.00	8.38E-07	1.81E-02	2.08E-04	8.54E-08	6.52E-03
921	467450.00	3782260.00	8.19E-07	1.77E-02	7.48E-04	8.34E-08	6.37E-03
922	467500.00	3782260.00	7.87E-07	1.70E-02	2.01E-04	8.02E-08	6.13E-03
923	465900.00	3782310.00	3.87E-07	8.34E-03	0	3.94E-08	3.01E-03
924	465950.00	3782310.00	3.92E-07	8.46E-03	2.39E-05	4.00E-08	3.05E-03
925	466000.00	3782310.00	4.06E-07	8.76E-03	0	4.14E-08	3.16E-03
926	466400.00	3782310.00	2.55E-07	5.49E-03	3.13E-04	2.60E-08	1.98E-03
927	467000.00	3782310.00	4.34E-07	9.35E-03	4.08E-04	4.42E-08	3.38E-03
928	467050.00	3782310.00	4.80E-07	1.04E-02	8.65E-04	4.90E-08	3.74E-03
929	467100.00	3782310.00	5.03E-07	1.08E-02	9.34E-04	5.13E-08	3.92E-03
930	467150.00	3782310.00	5.50E-07	1.19E-02	2.07E-04	5.60E-08	4.28E-03
931	467200.00	3782310.00	6.40E-07	1.38E-02	1.19E-03	6.52E-08	4.98E-03
932	467250.00	3782310.00	6.75E-07	1.46E-02	8.59E-04	6.88E-08	5.26E-03
933	467300.00	3782310.00	7.24E-07	1.56E-02	9.29E-04	7.37E-08	5.63E-03
934	467350.00	3782310.00	7.02E-07	1.51E-02	4.28E-04	7.15E-08	5.46E-03
935	467400.00	3782310.00	6.93E-07	1.49E-02	1.06E-04	7.06E-08	5.39E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
936	467450.00	3782310.00	6.86E-07	1.48E-02	7.82E-04	7.00E-08	5.34E-03
937	467500.00	3782310.00	6.82E-07	1.47E-02	3.35E-04	6.95E-08	5.31E-03
938	465900.00	3782360.00	3.51E-07	7.56E-03	3.78E-05	3.58E-08	2.73E-03
939	465950.00	3782360.00	3.53E-07	7.60E-03	1.80E-05	3.59E-08	2.75E-03
940	466000.00	3782360.00	3.40E-07	7.34E-03	2.91E-05	3.47E-08	2.65E-03
941	466050.00	3782360.00	3.37E-07	7.27E-03	4.38E-06	3.44E-08	2.63E-03
942	466400.00	3782360.00	2.04E-07	4.39E-03	2.28E-04	2.08E-08	1.59E-03
943	466950.00	3782360.00	3.43E-07	7.40E-03	2.84E-04	3.50E-08	2.67E-03
944	467000.00	3782360.00	3.72E-07	8.02E-03	6.63E-04	3.79E-08	2.89E-03
945	467050.00	3782360.00	4.06E-07	8.76E-03	8.35E-04	4.14E-08	3.16E-03
946	467100.00	3782360.00	4.28E-07	9.23E-03	3.98E-04	4.36E-08	3.33E-03
947	467150.00	3782360.00	4.49E-07	9.67E-03	7.80E-04	4.57E-08	3.49E-03
948	467200.00	3782360.00	4.74E-07	1.02E-02	1.12E-03	4.83E-08	3.69E-03
949	467250.00	3782360.00	5.73E-07	1.24E-02	4.71E-04	5.84E-08	4.46E-03
950	467300.00	3782360.00	6.10E-07	1.31E-02	7.44E-04	6.21E-08	4.74E-03
951	467350.00	3782360.00	6.12E-07	1.32E-02	4.99E-04	6.24E-08	4.77E-03
952	467400.00	3782360.00	5.93E-07	1.28E-02	1.76E-05	6.05E-08	4.62E-03
953	467450.00	3782360.00	6.01E-07	1.30E-02	8.52E-04	6.13E-08	4.68E-03
954	467500.00	3782360.00	5.78E-07	1.25E-02	3.55E-04	5.89E-08	4.49E-03
955	465900.00	3782410.00	3.08E-07	6.64E-03	4.96E-05	3.14E-08	2.40E-03
956	465950.00	3782410.00	3.00E-07	6.47E-03	4.50E-05	3.06E-08	2.34E-03
957	466000.00	3782410.00	2.89E-07	6.24E-03	0	2.95E-08	2.25E-03
958	466050.00	3782410.00	2.77E-07	5.96E-03	0	2.82E-08	2.15E-03
959	466100.00	3782410.00	2.58E-07	5.55E-03	7.99E-05	2.63E-08	2.01E-03
960	466900.00	3782410.00	2.78E-07	5.98E-03	3.98E-04	2.83E-08	2.16E-03
961	466950.00	3782410.00	2.97E-07	6.40E-03	4.26E-04	3.03E-08	2.31E-03
962	467000.00	3782410.00	3.29E-07	7.09E-03	6.52E-04	3.35E-08	2.56E-03
963	467050.00	3782410.00	3.51E-07	7.57E-03	1.22E-03	3.58E-08	2.73E-03
964	467100.00	3782410.00	3.71E-07	8.00E-03	0	3.78E-08	2.89E-03
965	467150.00	3782410.00	3.88E-07	8.37E-03	1.10E-03	3.96E-08	3.02E-03
966	467200.00	3782410.00	4.03E-07	8.70E-03	7.11E-04	4.11E-08	3.14E-03
967	467250.00	3782410.00	4.21E-07	9.09E-03	7.08E-04	4.30E-08	3.28E-03
968	467300.00	3782410.00	5.10E-07	1.10E-02	5.87E-04	5.20E-08	3.97E-03
969	467350.00	3782410.00	5.24E-07	1.13E-02	3.90E-04	5.34E-08	4.08E-03
970	467400.00	3782410.00	4.88E-07	1.05E-02	4.19E-04	4.97E-08	3.79E-03
971	467450.00	3782410.00	4.74E-07	1.02E-02	5.70E-04	4.83E-08	3.69E-03
972	467500.00	3782410.00	4.63E-07	9.98E-03	5.17E-04	4.72E-08	3.60E-03
973	465900.00	3782460.00	2.61E-07	5.62E-03	0	2.66E-08	2.03E-03
974	465950.00	3782460.00	2.50E-07	5.38E-03	0	2.55E-08	1.94E-03
975	466000.00	3782460.00	2.34E-07	5.04E-03	0	2.38E-08	1.82E-03
976	466050.00	3782460.00	2.20E-07	4.74E-03	3.41E-04	2.24E-08	1.71E-03
977	466100.00	3782460.00	1.99E-07	4.29E-03	5.34E-04	2.03E-08	1.55E-03
978	466150.00	3782460.00	1.81E-07	3.91E-03	4.62E-04	1.85E-08	1.41E-03
979	466200.00	3782460.00	1.65E-07	3.56E-03	1.55E-04	1.68E-08	1.29E-03
980	466250.00	3782460.00	1.52E-07	3.27E-03	9.22E-05	1.54E-08	1.18E-03
981	466350.00	3782460.00	1.35E-07	2.91E-03	0	1.38E-08	1.05E-03
982	466850.00	3782460.00	2.29E-07	4.93E-03	6.62E-04	2.33E-08	1.78E-03
983	466900.00	3782460.00	2.44E-07	5.25E-03	0	2.48E-08	1.90E-03
984	466950.00	3782460.00	2.71E-07	5.84E-03	5.27E-04	2.76E-08	2.11E-03
985	467000.00	3782460.00	2.91E-07	6.28E-03	5.14E-04	2.97E-08	2.27E-03
986	467050.00	3782460.00	3.07E-07	6.63E-03	7.90E-04	3.13E-08	2.39E-03
987	467100.00	3782460.00	3.24E-07	6.98E-03	0	3.30E-08	2.52E-03
988	467150.00	3782460.00	3.41E-07	7.34E-03	1.20E-03	3.47E-08	2.65E-03
989	467200.00	3782460.00	3.53E-07	7.60E-03	5.53E-04	3.60E-08	2.75E-03
990	467250.00	3782460.00	3.64E-07	7.84E-03	5.12E-04	3.71E-08	2.83E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
991	467300.00	3782460.00	4.42E-07	9.52E-03	4.31E-04	4.50E-08	3.44E-03
992	467350.00	3782460.00	4.61E-07	9.93E-03	3.74E-04	4.70E-08	3.59E-03
993	467400.00	3782460.00	3.90E-07	8.40E-03	5.59E-04	3.97E-08	3.03E-03
994	467450.00	3782460.00	3.91E-07	8.44E-03	2.46E-04	3.99E-08	3.05E-03
995	467500.00	3782460.00	3.80E-07	8.20E-03	5.83E-04	3.87E-08	2.96E-03
996	465700.00	3780160.00	-2.29E-08	0	0	-2.61E-09	0
997	465750.00	3780160.00	-2.45E-08	0	0	-2.79E-09	0
998	465800.00	3780160.00	-2.62E-08	0	0	-2.99E-09	0
999	465850.00	3780160.00	-2.81E-08	0	0	-3.20E-09	0
1000	465900.00	3780160.00	-3.00E-08	0	0	-3.43E-09	0
1001	465950.00	3780160.00	-3.21E-08	0	0	-3.67E-09	0
1002	466000.00	3780160.00	-3.44E-08	0	2.17E-05	-3.92E-09	0
1003	466050.00	3780160.00	-3.67E-08	0	9.61E-05	-4.20E-09	0
1004	466100.00	3780160.00	-3.93E-08	0	1.34E-04	-4.49E-09	0
1005	466150.00	3780160.00	-4.19E-08	0	3.22E-05	-4.79E-09	0
1006	466200.00	3780160.00	-4.47E-08	0	0	-5.11E-09	0
1007	466250.00	3780160.00	-4.76E-08	0	0	-5.44E-09	0
1008	466300.00	3780160.00	-5.07E-08	0	0	-5.79E-09	0
1009	466350.00	3780160.00	-5.34E-08	0	0	-6.10E-09	0
1010	466400.00	3780160.00	-5.68E-08	0	0	-6.49E-09	0
1011	466450.00	3780160.00	-6.03E-08	0	0	-6.89E-09	0
1012	466500.00	3780160.00	-6.37E-08	0	0	-7.27E-09	0
1013	466550.00	3780160.00	-6.72E-08	0	0	-7.67E-09	0
1014	466600.00	3780160.00	-7.07E-08	0	0	-8.08E-09	0
1015	466650.00	3780160.00	-7.44E-08	0	0	-8.49E-09	0
1016	466700.00	3780160.00	-7.80E-08	0	0	-8.91E-09	0
1017	466750.00	3780160.00	-8.17E-08	0	0	-9.33E-09	0
1018	466800.00	3780160.00	-8.53E-08	0	0	-9.74E-09	0
1019	466850.00	3780160.00	-8.89E-08	0	8.89E-05	-1.02E-08	0
1020	466900.00	3780160.00	-9.25E-08	0	0	-1.06E-08	0
1021	466950.00	3780160.00	-9.58E-08	0	0	-1.09E-08	0
1022	467000.00	3780160.00	-9.90E-08	0	0	-1.13E-08	0
1023	467050.00	3780160.00	-1.02E-07	0	0	-1.16E-08	0
1024	467100.00	3780160.00	-1.04E-07	0	0	-1.19E-08	0
1025	467150.00	3780160.00	-1.07E-07	0	0	-1.22E-08	0
1026	467200.00	3780160.00	-1.08E-07	0	0	-1.24E-08	0
1027	467250.00	3780160.00	-1.10E-07	0	0	-1.25E-08	0
1028	467300.00	3780160.00	-1.10E-07	0	0	-1.26E-08	0
1029	467350.00	3780160.00	-1.11E-07	0	0	-1.26E-08	0
1030	467400.00	3780160.00	-1.11E-07	0	0	-1.26E-08	0
1031	467450.00	3780160.00	-1.10E-07	0	0	-1.26E-08	0
1032	467500.00	3780160.00	-1.09E-07	0	0	-1.24E-08	0
1033	467550.00	3780160.00	-1.07E-07	0	0	-1.23E-08	0
1034	467600.00	3780160.00	-1.05E-07	0	0	-1.20E-08	0
1035	467650.00	3780160.00	-1.03E-07	0	0	-1.18E-08	0
1036	467700.00	3780160.00	-1.00E-07	0	0	-1.15E-08	0
1037	465700.00	3780210.00	-2.31E-08	0	0	-2.64E-09	0
1038	465750.00	3780210.00	-2.48E-08	0	0	-2.84E-09	0
1039	465800.00	3780210.00	-2.66E-08	0	0	-3.04E-09	0
1040	465850.00	3780210.00	-2.86E-08	0	0	-3.27E-09	0
1041	465900.00	3780210.00	-3.07E-08	0	0	-3.50E-09	0
1042	465950.00	3780210.00	-3.29E-08	0	0	-3.76E-09	0
1043	466000.00	3780210.00	-3.53E-08	0	0	-4.03E-09	0
1044	466050.00	3780210.00	-3.79E-08	0	3.89E-05	-4.32E-09	0
1045	466100.00	3780210.00	-4.06E-08	0	1.17E-04	-4.64E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1046	466150.00	3780210.00	-4.35E-08	0	1.33E-04	-4.97E-09	0
1047	466200.00	3780210.00	-4.66E-08	0	1.59E-05	-5.32E-09	0
1048	466250.00	3780210.00	-4.98E-08	0	0	-5.69E-09	0
1049	466300.00	3780210.00	-5.29E-08	0	0	-6.04E-09	0
1050	466350.00	3780210.00	-5.63E-08	0	0	-6.42E-09	0
1051	466400.00	3780210.00	-6.02E-08	0	0	-6.87E-09	0
1052	466450.00	3780210.00	-6.40E-08	0	0	-7.31E-09	0
1053	466500.00	3780210.00	-6.78E-08	0	0	-7.74E-09	0
1054	466550.00	3780210.00	-7.17E-08	0	0	-8.19E-09	0
1055	466600.00	3780210.00	-7.57E-08	0	0	-8.65E-09	0
1056	466650.00	3780210.00	-7.99E-08	0	0	-9.12E-09	0
1057	466700.00	3780210.00	-8.40E-08	0	0	-9.60E-09	0
1058	466750.00	3780210.00	-8.82E-08	0	0	-1.01E-08	0
1059	466800.00	3780210.00	-9.24E-08	0	0	-1.06E-08	0
1060	466850.00	3780210.00	-9.66E-08	0	7.06E-05	-1.10E-08	0
1061	466900.00	3780210.00	-1.01E-07	0	1.83E-05	-1.15E-08	0
1062	466950.00	3780210.00	-1.05E-07	0	0	-1.20E-08	0
1063	467000.00	3780210.00	-1.08E-07	0	0	-1.24E-08	0
1064	467050.00	3780210.00	-1.12E-07	0	0	-1.28E-08	0
1065	467100.00	3780210.00	-1.15E-07	0	0	-1.31E-08	0
1066	467150.00	3780210.00	-1.17E-07	0	0	-1.34E-08	0
1067	467200.00	3780210.00	-1.19E-07	0	0	-1.36E-08	0
1068	467250.00	3780210.00	-1.21E-07	0	0	-1.38E-08	0
1069	467300.00	3780210.00	-1.22E-07	0	0	-1.39E-08	0
1070	467350.00	3780210.00	-1.22E-07	0	0	-1.40E-08	0
1071	467400.00	3780210.00	-1.22E-07	0	0	-1.40E-08	0
1072	467450.00	3780210.00	-1.21E-07	0	0	-1.39E-08	0
1073	467500.00	3780210.00	-1.20E-07	0	0	-1.37E-08	0
1074	467550.00	3780210.00	-1.18E-07	0	0	-1.35E-08	0
1075	467600.00	3780210.00	-1.16E-07	0	0	-1.32E-08	0
1076	467650.00	3780210.00	-1.13E-07	0	0	-1.29E-08	0
1077	467700.00	3780210.00	-1.10E-07	0	0	-1.26E-08	0
1078	465700.00	3780260.00	-2.34E-08	0	0	-2.67E-09	0
1079	465750.00	3780260.00	-2.51E-08	0	0	-2.87E-09	0
1080	465800.00	3780260.00	-2.70E-08	0	0	-3.09E-09	0
1081	465850.00	3780260.00	-2.91E-08	0	0	-3.32E-09	0
1082	465900.00	3780260.00	-3.13E-08	0	0	-3.57E-09	0
1083	465950.00	3780260.00	-3.37E-08	0	0	-3.84E-09	0
1084	466000.00	3780260.00	-3.62E-08	0	0	-4.14E-09	0
1085	466050.00	3780260.00	-3.90E-08	0	0	-4.45E-09	0
1086	466100.00	3780260.00	-4.19E-08	0	5.83E-05	-4.78E-09	0
1087	466150.00	3780260.00	-4.50E-08	0	1.40E-04	-5.14E-09	0
1088	466200.00	3780260.00	-4.84E-08	0	1.30E-04	-5.53E-09	0
1089	466250.00	3780260.00	-5.19E-08	0	0	-5.93E-09	0
1090	466300.00	3780260.00	-5.54E-08	0	0	-6.33E-09	0
1091	466350.00	3780260.00	-5.92E-08	0	0	-6.77E-09	0
1092	466400.00	3780260.00	-6.37E-08	0	0	-7.27E-09	0
1093	466450.00	3780260.00	-6.78E-08	0	0	-7.74E-09	0
1094	466500.00	3780260.00	-7.22E-08	0	0	-8.24E-09	0
1095	466550.00	3780260.00	-7.66E-08	0	0	-8.75E-09	0
1096	466600.00	3780260.00	-8.12E-08	0	0	-9.27E-09	0
1097	466650.00	3780260.00	-8.59E-08	0	0	-9.81E-09	0
1098	466700.00	3780260.00	-9.07E-08	0	0	-1.04E-08	0
1099	466750.00	3780260.00	-9.55E-08	0	0	-1.09E-08	0
1100	466800.00	3780260.00	-1.00E-07	0	0	-1.15E-08	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1101	466850.00	3780260.00	-1.05E-07	0	0	-1.20E-08	0
1102	466900.00	3780260.00	-1.10E-07	0	6.38E-05	-1.26E-08	0
1103	466950.00	3780260.00	-1.15E-07	0	0	-1.31E-08	0
1104	467000.00	3780260.00	-1.19E-07	0	0	-1.36E-08	0
1105	467050.00	3780260.00	-1.23E-07	0	0	-1.40E-08	0
1106	467100.00	3780260.00	-1.27E-07	0	0	-1.45E-08	0
1107	467150.00	3780260.00	-1.30E-07	0	0	-1.48E-08	0
1108	467200.00	3780260.00	-1.32E-07	0	0	-1.51E-08	0
1109	467250.00	3780260.00	-1.34E-07	0	0	-1.53E-08	0
1110	467300.00	3780260.00	-1.35E-07	0	0	-1.54E-08	0
1111	467350.00	3780260.00	-1.36E-07	0	0	-1.55E-08	0
1112	467400.00	3780260.00	-1.35E-07	0	0	-1.55E-08	0
1113	467450.00	3780260.00	-1.34E-07	0	0	-1.54E-08	0
1114	467500.00	3780260.00	-1.33E-07	0	0	-1.52E-08	0
1115	467550.00	3780260.00	-1.31E-07	0	0	-1.49E-08	0
1116	467600.00	3780260.00	-1.28E-07	0	0	-1.46E-08	0
1117	467650.00	3780260.00	-1.25E-07	0	0	-1.42E-08	0
1118	467700.00	3780260.00	-1.21E-07	0	0	-1.38E-08	0
1119	465700.00	3780310.00	-2.36E-08	0	0	-2.69E-09	0
1120	465750.00	3780310.00	-2.54E-08	0	0	-2.90E-09	0
1121	465800.00	3780310.00	-2.73E-08	0	0	-3.12E-09	0
1122	465850.00	3780310.00	-2.95E-08	0	0	-3.37E-09	0
1123	465900.00	3780310.00	-3.18E-08	0	0	-3.63E-09	0
1124	465950.00	3780310.00	-3.43E-08	0	0	-3.92E-09	0
1125	466000.00	3780310.00	-3.71E-08	0	0	-4.23E-09	0
1126	466050.00	3780310.00	-4.00E-08	0	0	-4.57E-09	0
1127	466100.00	3780310.00	-4.32E-08	0	0	-4.93E-09	0
1128	466150.00	3780310.00	-4.66E-08	0	8.08E-05	-5.32E-09	0
1129	466200.00	3780310.00	-5.02E-08	0	1.64E-04	-5.73E-09	0
1130	466250.00	3780310.00	-5.39E-08	0	1.25E-04	-6.15E-09	0
1131	466300.00	3780310.00	-5.80E-08	0	0	-6.62E-09	0
1132	466350.00	3780310.00	-6.24E-08	0	0	-7.13E-09	0
1133	466400.00	3780310.00	-6.72E-08	0	0	-7.68E-09	0
1134	466500.00	3780310.00	-7.68E-08	0	0	-8.77E-09	0
1135	466550.00	3780310.00	-8.19E-08	0	0	-9.35E-09	0
1136	466600.00	3780310.00	-8.71E-08	0	0	-9.95E-09	0
1137	466650.00	3780310.00	-9.24E-08	0	0	-1.06E-08	0
1138	466700.00	3780310.00	-9.79E-08	0	0	-1.12E-08	0
1139	466750.00	3780310.00	-1.04E-07	0	0	-1.18E-08	0
1140	466800.00	3780310.00	-1.09E-07	0	0	-1.25E-08	0
1141	466850.00	3780310.00	-1.15E-07	0	0	-1.31E-08	0
1142	466900.00	3780310.00	-1.20E-07	0	1.12E-04	-1.37E-08	0
1143	466950.00	3780310.00	-1.26E-07	0	0	-1.44E-08	0
1144	467000.00	3780310.00	-1.31E-07	0	0	-1.49E-08	0
1145	467050.00	3780310.00	-1.36E-07	0	0	-1.55E-08	0
1146	467100.00	3780310.00	-1.40E-07	0	0	-1.60E-08	0
1147	467150.00	3780310.00	-1.44E-07	0	0	-1.64E-08	0
1148	467200.00	3780310.00	-1.47E-07	0	0	-1.67E-08	0
1149	467250.00	3780310.00	-1.49E-07	0	0	-1.70E-08	0
1150	467300.00	3780310.00	-1.50E-07	0	0	-1.72E-08	0
1151	467350.00	3780310.00	-1.51E-07	0	0	-1.72E-08	0
1152	467400.00	3780310.00	-1.51E-07	0	0	-1.72E-08	0
1153	467450.00	3780310.00	-1.50E-07	0	0	-1.71E-08	0
1154	467500.00	3780310.00	-1.48E-07	0	0	-1.69E-08	0
1155	467550.00	3780310.00	-1.45E-07	0	0	-1.66E-08	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1156	467600.00	3780310.00	-1.42E-07	0	0	-1.62E-08	0
1157	467650.00	3780310.00	-1.38E-07	0	0	-1.57E-08	0
1158	467700.00	3780310.00	-1.33E-07	0	0	-1.52E-08	0
1159	465700.00	3780360.00	-2.37E-08	0	0	-2.71E-09	0
1160	465750.00	3780360.00	-2.56E-08	0	0	-2.92E-09	0
1161	465800.00	3780360.00	-2.76E-08	0	0	-3.16E-09	0
1162	465850.00	3780360.00	-2.99E-08	0	0	-3.41E-09	0
1163	467550.00	3780360.00	-1.62E-07	0	0	-1.85E-08	0
1164	467600.00	3780360.00	-1.58E-07	0	0	-1.80E-08	0
1165	467650.00	3780360.00	-1.53E-07	0	0	-1.75E-08	0
1166	467700.00	3780360.00	-1.47E-07	0	0	-1.68E-08	0
1167	465700.00	3780410.00	-2.39E-08	0	0	-2.73E-09	0
1168	465750.00	3780410.00	-2.58E-08	0	0	-2.94E-09	0
1169	465800.00	3780410.00	-2.78E-08	0	0	-3.18E-09	0
1170	465850.00	3780410.00	-3.02E-08	0	0	-3.44E-09	0
1171	467550.00	3780410.00	-1.81E-07	0	0	-2.07E-08	0
1172	467600.00	3780410.00	-1.76E-07	0	0	-2.01E-08	0
1173	467650.00	3780410.00	-1.70E-07	0	0	-1.95E-08	0
1174	467700.00	3780410.00	-1.64E-07	0	0	-1.87E-08	0
1175	465700.00	3780460.00	-2.39E-08	0	0	-2.73E-09	0
1176	465750.00	3780460.00	-2.59E-08	0	0	-2.95E-09	0
1177	465800.00	3780460.00	-2.80E-08	0	0	-3.20E-09	0
1178	465850.00	3780460.00	-3.04E-08	0	0	-3.47E-09	0
1179	467550.00	3780460.00	-2.04E-07	0	0	-2.33E-08	0
1180	467600.00	3780460.00	-1.98E-07	0	0	-2.26E-08	0
1181	467650.00	3780460.00	-1.91E-07	0	0	-2.18E-08	0
1182	467700.00	3780460.00	-1.83E-07	0	0	-2.09E-08	0
1183	465700.00	3780510.00	-2.40E-08	0	0	-2.74E-09	0
1184	465750.00	3780510.00	-2.59E-08	0	0	-2.96E-09	0
1185	465800.00	3780510.00	-2.81E-08	0	0	-3.21E-09	0
1186	465850.00	3780510.00	-3.06E-08	0	0	-3.49E-09	0
1187	467550.00	3780510.00	-2.31E-07	0	0	-2.63E-08	0
1188	467600.00	3780510.00	-2.23E-07	0	0	-2.55E-08	0
1189	467650.00	3780510.00	-2.15E-07	0	0	-2.45E-08	0
1190	467700.00	3780510.00	-2.05E-07	0	0	-2.34E-08	0
1191	465700.00	3780560.00	-2.39E-08	0	0	-2.73E-09	0
1192	465750.00	3780560.00	-2.59E-08	0	0	-2.96E-09	0
1193	465800.00	3780560.00	-2.82E-08	0	0	-3.22E-09	0
1194	465850.00	3780560.00	-3.07E-08	0	0	-3.50E-09	0
1195	467550.00	3780560.00	-2.62E-07	0	0	-2.99E-08	0
1196	467600.00	3780560.00	-2.53E-07	0	0	-2.89E-08	0
1197	467650.00	3780560.00	-2.43E-07	0	0	-2.77E-08	0
1198	467700.00	3780560.00	-2.31E-07	0	0	-2.64E-08	0
1199	465700.00	3780610.00	-2.38E-08	0	0	-2.71E-09	0
1200	465750.00	3780610.00	-2.58E-08	0	0	-2.95E-09	0
1201	465800.00	3780610.00	-2.81E-08	0	0	-3.21E-09	0
1202	465850.00	3780610.00	-3.07E-08	0	0	-3.51E-09	0
1203	467550.00	3780610.00	-3.01E-07	0	0	-3.43E-08	0
1204	467600.00	3780610.00	-2.89E-07	0	0	-3.30E-08	0
1205	467650.00	3780610.00	-2.76E-07	0	0	-3.15E-08	0
1206	467700.00	3780610.00	-2.62E-07	0	0	-2.99E-08	0
1207	465700.00	3780660.00	-2.35E-08	0	0	-2.69E-09	0
1208	465750.00	3780660.00	-2.56E-08	0	0	-2.93E-09	0
1209	465800.00	3780660.00	-2.80E-08	0	0	-3.20E-09	0
1210	465850.00	3780660.00	-3.06E-08	0	0	-3.49E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1211	467550.00	3780660.00	-3.47E-07	0	0	-3.97E-08	0
1212	467600.00	3780660.00	-3.32E-07	0	0	-3.80E-08	0
1213	467650.00	3780660.00	-3.16E-07	0	0	-3.61E-08	0
1214	467700.00	3780660.00	-2.98E-07	0	0	-3.40E-08	0
1215	465700.00	3780710.00	-2.31E-08	0	0	-2.64E-09	0
1216	465750.00	3780710.00	-2.53E-08	0	0	-2.89E-09	0
1217	465800.00	3780710.00	-2.77E-08	0	0	-3.16E-09	0
1218	465850.00	3780710.00	-3.04E-08	0	0	-3.47E-09	0
1219	467550.00	3780710.00	-4.04E-07	0	0	-4.61E-08	0
1220	467600.00	3780710.00	-3.85E-07	0	0	-4.40E-08	0
1221	467650.00	3780710.00	-3.63E-07	0	0	-4.15E-08	0
1222	467700.00	3780710.00	-3.41E-07	0	0	-3.89E-08	0
1223	465700.00	3780760.00	-2.26E-08	0	0	-2.58E-09	0
1224	465750.00	3780760.00	-2.48E-08	0	0	-2.83E-09	0
1225	465800.00	3780760.00	-2.72E-08	0	0	-3.11E-09	0
1226	465850.00	3780760.00	-2.99E-08	0	0	-3.42E-09	0
1227	467550.00	3780760.00	-4.74E-07	0	0	-5.42E-08	0
1228	467600.00	3780760.00	-4.50E-07	0	0	-5.13E-08	0
1229	467650.00	3780760.00	-4.21E-07	0	0	-4.81E-08	0
1230	467700.00	3780760.00	-3.92E-07	0	0	-4.48E-08	0
1231	465700.00	3780810.00	-2.19E-08	0	0	-2.51E-09	0
1232	465750.00	3780810.00	-2.41E-08	0	0	-2.75E-09	0
1233	465800.00	3780810.00	-2.66E-08	0	0	-3.03E-09	0
1234	465850.00	3780810.00	-2.93E-08	0	0	-3.35E-09	0
1235	467550.00	3780810.00	-5.62E-07	0	0	-6.42E-08	0
1236	467600.00	3780810.00	-5.30E-07	0	0	-6.05E-08	0
1237	467650.00	3780810.00	-4.92E-07	0	0	-5.62E-08	0
1238	467700.00	3780810.00	-4.55E-07	0	0	-5.19E-08	0
1239	465700.00	3780860.00	-2.11E-08	0	1.11E-04	-2.41E-09	0
1240	465750.00	3780860.00	-2.32E-08	0	8.69E-05	-2.64E-09	0
1241	465800.00	3780860.00	-2.57E-08	0	0	-2.94E-09	0
1242	465850.00	3780860.00	-2.84E-08	0	0	-3.25E-09	0
1243	467550.00	3780860.00	-6.74E-07	0	0	-7.70E-08	0
1244	467600.00	3780860.00	-6.28E-07	0	0	-7.17E-08	0
1245	467650.00	3780860.00	-5.79E-07	0	0	-6.61E-08	0
1246	467700.00	3780860.00	-5.30E-07	0	0	-6.05E-08	0
1247	465700.00	3780910.00	-1.98E-08	0	1.19E-04	-2.27E-09	0
1248	465750.00	3780910.00	-2.21E-08	0	1.35E-04	-2.53E-09	0
1249	465800.00	3780910.00	-2.44E-08	0	1.34E-04	-2.79E-09	0
1250	465850.00	3780910.00	-2.72E-08	0	1.10E-04	-3.11E-09	0
1251	467550.00	3780910.00	-8.17E-07	0	0	-9.33E-08	0
1252	467600.00	3780910.00	-7.55E-07	0	0	-8.62E-08	0
1253	467650.00	3780910.00	-6.88E-07	0	0	-7.86E-08	0
1254	467700.00	3780910.00	-6.23E-07	0	0	-7.11E-08	0
1255	465700.00	3780960.00	-1.86E-08	0	6.80E-05	-2.12E-09	0
1256	465750.00	3780960.00	-2.08E-08	0	1.04E-04	-2.37E-09	0
1257	465800.00	3780960.00	-2.30E-08	0	1.33E-04	-2.63E-09	0
1258	465850.00	3780960.00	-2.59E-08	0	1.52E-04	-2.96E-09	0
1259	467550.00	3780960.00	-1.01E-06	0	0	-1.15E-07	0
1260	467600.00	3780960.00	-9.18E-07	0	0	-1.05E-07	0
1261	467650.00	3780960.00	-8.25E-07	0	0	-9.43E-08	0
1262	467700.00	3780960.00	-7.37E-07	0	0	-8.42E-08	0
1263	465700.00	3781010.00	-1.76E-08	0	0	-2.01E-09	0
1264	465750.00	3781010.00	-1.94E-08	0	2.42E-05	-2.22E-09	0
1265	465800.00	3781010.00	-2.15E-08	0	7.54E-05	-2.46E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1266	465850.00	3781010.00	-2.42E-08	0	1.17E-04	-2.77E-09	0
1267	467550.00	3781010.00	-1.26E-06	0	0	-1.44E-07	0
1268	467600.00	3781010.00	-1.13E-06	0	0	-1.29E-07	0
1269	467650.00	3781010.00	-1.00E-06	0	0	-1.14E-07	0
1270	467700.00	3781010.00	-8.79E-07	0	0	-1.00E-07	0
1271	465700.00	3781060.00	-1.65E-08	0	1.60E-05	-1.89E-09	0
1272	465750.00	3781060.00	-1.83E-08	0	1.19E-06	-2.09E-09	0
1273	465800.00	3781060.00	-2.03E-08	0	0	-2.32E-09	0
1274	465850.00	3781060.00	-2.27E-08	0	9.69E-06	-2.59E-09	0
1275	467550.00	3781060.00	-1.60E-06	0	0	-1.82E-07	0
1276	467600.00	3781060.00	-1.41E-06	0	0	-1.61E-07	0
1277	467650.00	3781060.00	-1.23E-06	0	0	-1.41E-07	0
1278	467700.00	3781060.00	-1.06E-06	0	0	-1.21E-07	0
1279	465700.00	3781110.00	-8.07E-09	0	0	-9.21E-10	0
1280	465750.00	3781110.00	-1.19E-08	0	0	-1.36E-09	0
1281	465800.00	3781110.00	-1.89E-08	0	4.71E-05	-2.16E-09	0
1282	465850.00	3781110.00	-2.10E-08	0	2.70E-05	-2.40E-09	0
1283	467550.00	3781110.00	-2.08E-06	0	0	-2.38E-07	0
1284	467600.00	3781110.00	-1.79E-06	0	0	-2.05E-07	0
1285	467650.00	3781110.00	-1.53E-06	0	0	-1.74E-07	0
1286	467700.00	3781110.00	-1.29E-06	0	0	-1.47E-07	0
1287	465700.00	3781160.00	-3.48E-09	0	0	-3.98E-10	0
1288	465750.00	3781160.00	-7.47E-09	0	0	-8.53E-10	0
1289	465800.00	3781160.00	-1.31E-08	0	0	-1.50E-09	0
1290	465850.00	3781160.00	-1.94E-08	0	5.85E-05	-2.22E-09	0
1291	467550.00	3781160.00	-2.76E-06	0	0	-3.15E-07	0
1292	467600.00	3781160.00	-2.31E-06	0	0	-2.64E-07	0
1293	467650.00	3781160.00	-1.91E-06	0	0	-2.19E-07	0
1294	467700.00	3781160.00	-1.58E-06	0	0	-1.80E-07	0
1295	465700.00	3781210.00	-1.64E-09	0	0	-1.87E-10	0
1296	465750.00	3781210.00	-2.79E-09	0	0	-3.19E-10	0
1297	465800.00	3781210.00	-7.25E-09	0	0	-8.28E-10	0
1298	465850.00	3781210.00	-1.42E-08	0	0	-1.62E-09	0
1299	467550.00	3781210.00	-3.76E-06	0	0	-4.30E-07	0
1300	467600.00	3781210.00	-3.04E-06	0	0	-3.47E-07	0
1301	467650.00	3781210.00	-2.43E-06	0	0	-2.77E-07	0
1302	467700.00	3781210.00	-1.95E-06	0	0	-2.23E-07	0
1303	465700.00	3781260.00	-2.51E-10	0	0	-2.87E-11	0
1304	465750.00	3781260.00	-8.73E-10	0	0	-9.97E-11	0
1305	465800.00	3781260.00	-2.90E-09	0	0	-3.32E-10	0
1306	465850.00	3781260.00	-5.63E-09	0	0	-6.43E-10	0
1307	467550.00	3781260.00	-5.29E-06	0	0	-6.04E-07	0
1308	467600.00	3781260.00	-4.06E-06	0	0	-4.63E-07	0
1309	467650.00	3781260.00	-3.12E-06	0	0	-3.56E-07	0
1310	467700.00	3781260.00	-2.43E-06	0	4.88E-06	-2.77E-07	0
1311	465700.00	3781310.00	4.20E-10	9.06E-06	0	4.28E-11	3.27E-06
1312	465750.00	3781310.00	-2.18E-11	0	0	-2.49E-12	0
1313	465800.00	3781310.00	3.50E-09	7.55E-05	0	3.57E-10	2.73E-05
1314	465850.00	3781310.00	7.52E-10	1.62E-05	0	7.66E-11	5.85E-06
1315	467550.00	3781310.00	-7.62E-06	0	0	-8.70E-07	0
1316	467600.00	3781310.00	-5.50E-06	0	0	-6.28E-07	0
1317	467650.00	3781310.00	-4.02E-06	0	0	-4.59E-07	0
1318	467700.00	3781310.00	-2.99E-06	0	0	-3.42E-07	0
1319	465700.00	3781360.00	-6.55E-10	0	0	-7.48E-11	0
1320	465750.00	3781360.00	-7.42E-10	0	0	-8.48E-11	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1321	465800.00	3781360.00	4.97E-10	1.07E-05	0	5.06E-11	3.87E-06
1322	465850.00	3781360.00	1.06E-09	2.28E-05	0	1.08E-10	8.23E-06
1323	467550.00	3781360.00	-1.11E-05	0	0	-1.27E-06	0
1324	467600.00	3781360.00	-7.34E-06	0	0	-8.38E-07	0
1325	467650.00	3781360.00	-5.01E-06	0	0	-5.72E-07	0
1326	467700.00	3781360.00	-3.53E-06	0	0	-4.03E-07	0
1327	465700.00	3781410.00	-5.02E-09	0	0	-5.73E-10	0
1328	465750.00	3781410.00	-4.49E-09	0	0	-5.12E-10	0
1329	465800.00	3781410.00	-5.02E-10	0	0	-5.74E-11	0
1330	465850.00	3781410.00	-6.33E-10	0	0	-7.23E-11	0
1331	467550.00	3781410.00	-1.50E-05	0	0	-1.71E-06	0
1332	467600.00	3781410.00	-8.85E-06	0	0	-1.01E-06	0
1333	467650.00	3781410.00	-5.57E-06	0	0	-6.37E-07	0
1334	467700.00	3781410.00	-3.67E-06	0	0	-4.20E-07	0
1335	465700.00	3781460.00	-2.97E-08	0	0	-3.39E-09	0
1336	465750.00	3781460.00	-7.94E-09	0	0	-9.06E-10	0
1337	465800.00	3781460.00	-3.86E-09	0	0	-4.41E-10	0
1338	465850.00	3781460.00	-4.36E-09	0	0	-4.97E-10	0
1339	467550.00	3781460.00	-1.52E-05	0	0	-1.74E-06	0
1340	467600.00	3781460.00	-8.12E-06	0	0	-9.28E-07	0
1341	467650.00	3781460.00	-4.72E-06	0	0	-5.39E-07	0
1342	467700.00	3781460.00	-2.91E-06	0	0	-3.32E-07	0
1343	465700.00	3781510.00	-5.78E-08	0	0	-6.60E-09	0
1344	465750.00	3781510.00	-4.48E-08	0	0	-5.12E-09	0
1345	465800.00	3781510.00	-1.00E-08	0	0	-1.14E-09	0
1346	465850.00	3781510.00	-1.13E-08	0	0	-1.29E-09	0
1347	467550.00	3781510.00	-7.85E-06	0	0	-8.96E-07	0
1348	467600.00	3781510.00	-3.76E-06	0	0	-4.29E-07	0
1349	467650.00	3781510.00	-1.95E-06	0	8.65E-05	-2.23E-07	0
1350	467700.00	3781510.00	-1.07E-06	0	0	-1.23E-07	0
1351	465700.00	3781560.00	-1.00E-07	0	0	-1.15E-08	0
1352	465750.00	3781560.00	-6.38E-08	0	0	-7.29E-09	0
1353	465800.00	3781560.00	-3.66E-08	0	0	-4.18E-09	0
1354	465850.00	3781560.00	-3.60E-08	0	0	-4.12E-09	0
1355	467600.00	3781560.00	2.89E-06	6.24E-02	0	2.95E-07	2.25E-02
1356	467650.00	3781560.00	2.05E-06	4.41E-02	0	2.09E-07	1.59E-02
1357	467700.00	3781560.00	1.45E-06	3.12E-02	0	1.48E-07	1.13E-02
1358	465700.00	3781610.00	-1.52E-07	0	0	-1.74E-08	0
1359	465750.00	3781610.00	-1.35E-07	0	0	-1.55E-08	0
1360	465800.00	3781610.00	-1.34E-07	0	0	-1.53E-08	0
1361	465850.00	3781610.00	-1.17E-07	0	0	-1.34E-08	0
1362	467550.00	3781610.00	1.59E-05	3.44E-01	4.95E-03	1.62E-06	1.24E-01
1363	467600.00	3781610.00	8.89E-06	1.92E-01	5.24E-03	9.06E-07	6.92E-02
1364	467650.00	3781610.00	5.34E-06	1.15E-01	1.84E-03	5.44E-07	4.16E-02
1365	467700.00	3781610.00	3.56E-06	7.68E-02	4.68E-04	3.63E-07	2.77E-02
1366	465700.00	3781660.00	-1.94E-07	0	0	-2.22E-08	0
1367	465750.00	3781660.00	-2.03E-07	0	0	-2.32E-08	0
1368	465800.00	3781660.00	-1.98E-07	0	0	-2.26E-08	0
1369	465850.00	3781660.00	-2.17E-07	0	0	-2.48E-08	0
1370	467550.00	3781660.00	1.88E-05	4.05E-01	1.17E-03	1.91E-06	1.46E-01
1371	467600.00	3781660.00	1.06E-05	2.28E-01	3.94E-03	1.08E-06	8.22E-02
1372	467650.00	3781660.00	6.58E-06	1.42E-01	4.00E-03	6.71E-07	5.12E-02
1373	467700.00	3781660.00	4.32E-06	9.32E-02	3.22E-03	4.41E-07	3.37E-02
1374	465700.00	3781710.00	-2.42E-07	0	0	-2.76E-08	0
1375	465750.00	3781710.00	-2.50E-07	0	0	-2.86E-08	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1376	465800.00	3781710.00	-2.50E-07	0	0	-2.86E-08	0
1377	465850.00	3781710.00	-2.69E-07	0	0	-3.07E-08	0
1378	467550.00	3781710.00	1.47E-05	3.18E-01	8.49E-03	1.50E-06	1.15E-01
1379	467600.00	3781710.00	9.01E-06	1.94E-01	4.06E-03	9.18E-07	7.01E-02
1380	467650.00	3781710.00	5.90E-06	1.27E-01	2.81E-03	6.01E-07	4.59E-02
1381	467700.00	3781710.00	4.07E-06	8.78E-02	1.95E-03	4.15E-07	3.17E-02
1382	465700.00	3781760.00	-2.75E-07	0	0	-3.14E-08	0
1383	465750.00	3781760.00	-2.74E-07	0	0	-3.13E-08	0
1384	465800.00	3781760.00	-2.94E-07	0	0	-3.36E-08	0
1385	465850.00	3781760.00	-3.01E-07	0	0	-3.44E-08	0
1386	467550.00	3781760.00	1.03E-05	2.22E-01	3.32E-03	1.05E-06	8.02E-02
1387	467600.00	3781760.00	6.81E-06	1.47E-01	1.01E-03	6.95E-07	5.30E-02
1388	467650.00	3781760.00	4.70E-06	1.01E-01	2.15E-03	4.79E-07	3.66E-02
1389	467700.00	3781760.00	3.37E-06	7.27E-02	3.28E-03	3.44E-07	2.63E-02
1390	465700.00	3781810.00	-2.72E-07	0	0	-3.11E-08	0
1391	465750.00	3781810.00	-2.80E-07	0	0	-3.20E-08	0
1392	465800.00	3781810.00	-2.96E-07	0	0	-3.38E-08	0
1393	465850.00	3781810.00	-3.03E-07	0	0	-3.46E-08	0
1394	467550.00	3781810.00	7.23E-06	1.56E-01	1.08E-02	7.36E-07	5.62E-02
1395	467600.00	3781810.00	5.09E-06	1.10E-01	1.20E-03	5.19E-07	3.96E-02
1396	467650.00	3781810.00	3.67E-06	7.91E-02	0	3.74E-07	2.86E-02
1397	467700.00	3781810.00	2.72E-06	5.85E-02	1.44E-04	2.77E-07	2.11E-02
1398	465700.00	3781860.00	-2.53E-07	0	0	-2.89E-08	0
1399	465750.00	3781860.00	-2.58E-07	0	0	-2.95E-08	0
1400	465800.00	3781860.00	-2.64E-07	0	0	-3.02E-08	0
1401	465850.00	3781860.00	-2.68E-07	0	0	-3.06E-08	0
1402	467550.00	3781860.00	5.34E-06	1.15E-01	9.00E-03	5.44E-07	4.16E-02
1403	467600.00	3781860.00	4.01E-06	8.64E-02	6.45E-03	4.08E-07	3.12E-02
1404	467650.00	3781860.00	2.98E-06	6.42E-02	2.09E-04	3.03E-07	2.32E-02
1405	467700.00	3781860.00	2.25E-06	4.86E-02	0	2.30E-07	1.75E-02
1406	465700.00	3781910.00	-2.04E-07	0	0	-2.33E-08	0
1407	465750.00	3781910.00	-2.03E-07	0	0	-2.32E-08	0
1408	465800.00	3781910.00	-2.00E-07	0	0	-2.29E-08	0
1409	465850.00	3781910.00	-1.96E-07	0	0	-2.24E-08	0
1410	467550.00	3781910.00	3.82E-06	8.23E-02	4.15E-03	3.89E-07	2.97E-02
1411	467600.00	3781910.00	3.11E-06	6.71E-02	6.21E-03	3.17E-07	2.42E-02
1412	467650.00	3781910.00	2.42E-06	5.22E-02	3.58E-03	2.47E-07	1.89E-02
1413	467700.00	3781910.00	1.92E-06	4.13E-02	0	1.95E-07	1.49E-02
1414	465700.00	3781960.00	-1.36E-07	0	0	-1.55E-08	0
1415	465750.00	3781960.00	-1.24E-07	0	0	-1.41E-08	0
1416	465800.00	3781960.00	-1.15E-07	0	0	-1.31E-08	0
1417	465850.00	3781960.00	-9.88E-08	0	0	-1.13E-08	0
1418	467550.00	3781960.00	2.89E-06	6.23E-02	1.50E-03	2.94E-07	2.25E-02
1419	467600.00	3781960.00	2.39E-06	5.15E-02	2.81E-03	2.43E-07	1.86E-02
1420	467650.00	3781960.00	1.95E-06	4.21E-02	3.90E-03	1.99E-07	1.52E-02
1421	467700.00	3781960.00	1.65E-06	3.56E-02	2.24E-03	1.68E-07	1.28E-02
1422	465700.00	3782010.00	-4.94E-08	0	0	-5.65E-09	0
1423	465750.00	3782010.00	-2.38E-08	0	0	-2.72E-09	0
1424	465800.00	3782010.00	-1.12E-08	0	0	-1.28E-09	0
1425	465850.00	3782010.00	1.34E-08	2.90E-04	0	1.37E-09	1.05E-04
1426	467550.00	3782010.00	2.22E-06	4.79E-02	2.08E-03	2.26E-07	1.73E-02
1427	467600.00	3782010.00	1.90E-06	4.11E-02	4.37E-04	1.94E-07	1.48E-02
1428	467650.00	3782010.00	1.62E-06	3.49E-02	2.51E-03	1.65E-07	1.26E-02
1429	467700.00	3782010.00	1.36E-06	2.93E-02	3.34E-03	1.38E-07	1.06E-02
1430	465700.00	3782060.00	4.60E-08	9.93E-04	0	4.69E-09	3.58E-04

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1431	465750.00	3782060.00	7.35E-08	1.59E-03	0	7.49E-09	5.72E-04
1432	465800.00	3782060.00	1.10E-07	2.37E-03	0	1.12E-08	8.56E-04
1433	465850.00	3782060.00	1.71E-07	3.69E-03	0	1.75E-08	1.33E-03
1434	467550.00	3782060.00	1.76E-06	3.79E-02	1.53E-03	1.79E-07	1.37E-02
1435	467600.00	3782060.00	1.54E-06	3.32E-02	4.92E-04	1.57E-07	1.20E-02
1436	467650.00	3782060.00	1.33E-06	2.87E-02	5.75E-04	1.36E-07	1.03E-02
1437	467700.00	3782060.00	1.14E-06	2.45E-02	2.12E-03	1.16E-07	8.86E-03
1438	465700.00	3782110.00	1.48E-07	3.19E-03	0	1.51E-08	1.15E-03
1439	465750.00	3782110.00	1.73E-07	3.72E-03	0	1.76E-08	1.34E-03
1440	465800.00	3782110.00	2.11E-07	4.54E-03	0	2.15E-08	1.64E-03
1441	465850.00	3782110.00	2.81E-07	6.06E-03	0	2.87E-08	2.19E-03
1442	467550.00	3782110.00	1.39E-06	3.00E-02	1.38E-03	1.42E-07	1.08E-02
1443	467600.00	3782110.00	1.25E-06	2.70E-02	1.16E-03	1.27E-07	9.73E-03
1444	467650.00	3782110.00	1.10E-06	2.37E-02	0	1.12E-07	8.56E-03
1445	467700.00	3782110.00	9.42E-07	2.03E-02	4.03E-04	9.61E-08	7.33E-03
1446	465700.00	3782160.00	2.32E-07	4.99E-03	0	2.36E-08	1.80E-03
1447	465750.00	3782160.00	2.54E-07	5.48E-03	0	2.59E-08	1.98E-03
1448	465800.00	3782160.00	3.03E-07	6.54E-03	0	3.09E-08	2.36E-03
1449	465850.00	3782160.00	3.44E-07	7.41E-03	1.38E-04	3.51E-08	2.68E-03
1450	467550.00	3782160.00	1.10E-06	2.36E-02	1.03E-03	1.12E-07	8.54E-03
1451	467600.00	3782160.00	9.91E-07	2.14E-02	1.51E-03	1.01E-07	7.71E-03
1452	467650.00	3782160.00	8.93E-07	1.93E-02	3.82E-04	9.10E-08	6.95E-03
1453	467700.00	3782160.00	7.96E-07	1.72E-02	3.50E-05	8.11E-08	6.20E-03
1454	465700.00	3782210.00	2.78E-07	5.99E-03	2.26E-05	2.83E-08	2.16E-03
1455	465750.00	3782210.00	3.05E-07	6.57E-03	1.68E-04	3.11E-08	2.37E-03
1456	465800.00	3782210.00	3.42E-07	7.37E-03	2.81E-04	3.49E-08	2.66E-03
1457	465850.00	3782210.00	3.83E-07	8.26E-03	3.35E-04	3.90E-08	2.98E-03
1458	467550.00	3782210.00	8.93E-07	1.93E-02	8.76E-04	9.10E-08	6.95E-03
1459	467600.00	3782210.00	8.28E-07	1.78E-02	1.11E-03	8.44E-08	6.44E-03
1460	467650.00	3782210.00	7.55E-07	1.63E-02	9.07E-04	7.69E-08	5.88E-03
1461	467700.00	3782210.00	6.95E-07	1.50E-02	0	7.09E-08	5.41E-03
1462	465700.00	3782260.00	3.10E-07	6.68E-03	3.01E-04	3.16E-08	2.41E-03
1463	465750.00	3782260.00	3.35E-07	7.22E-03	3.26E-04	3.41E-08	2.61E-03
1464	465800.00	3782260.00	3.66E-07	7.88E-03	9.98E-05	3.73E-08	2.85E-03
1465	465850.00	3782260.00	3.85E-07	8.31E-03	0	3.93E-08	3.00E-03
1466	467550.00	3782260.00	7.55E-07	1.63E-02	3.87E-04	7.69E-08	5.87E-03
1467	467600.00	3782260.00	7.05E-07	1.52E-02	7.28E-04	7.19E-08	5.49E-03
1468	467650.00	3782260.00	6.78E-07	1.46E-02	1.21E-03	6.91E-08	5.27E-03
1469	467700.00	3782260.00	6.30E-07	1.36E-02	2.06E-04	6.42E-08	4.90E-03
1470	465700.00	3782310.00	3.25E-07	7.01E-03	6.74E-05	3.32E-08	2.53E-03
1471	465750.00	3782310.00	3.38E-07	7.28E-03	0	3.44E-08	2.63E-03
1472	465800.00	3782310.00	3.59E-07	7.74E-03	0	3.66E-08	2.80E-03
1473	465850.00	3782310.00	3.75E-07	8.09E-03	2.24E-05	3.83E-08	2.92E-03
1474	467550.00	3782310.00	6.54E-07	1.41E-02	0	6.66E-08	5.09E-03
1475	467600.00	3782310.00	6.15E-07	1.33E-02	6.76E-04	6.27E-08	4.79E-03
1476	467650.00	3782310.00	5.53E-07	1.19E-02	7.74E-04	5.63E-08	4.30E-03
1477	467700.00	3782310.00	5.18E-07	1.12E-02	3.85E-04	5.28E-08	4.03E-03
1478	465700.00	3782360.00	3.19E-07	6.88E-03	0	3.25E-08	2.48E-03
1479	465750.00	3782360.00	3.27E-07	7.04E-03	0	3.33E-08	2.54E-03
1480	465800.00	3782360.00	3.40E-07	7.33E-03	0	3.46E-08	2.65E-03
1481	465850.00	3782360.00	3.45E-07	7.45E-03	0	3.52E-08	2.69E-03
1482	467550.00	3782360.00	5.64E-07	1.22E-02	0	5.75E-08	4.39E-03
1483	467600.00	3782360.00	5.45E-07	1.18E-02	8.09E-04	5.56E-08	4.24E-03
1484	467650.00	3782360.00	5.04E-07	1.09E-02	5.41E-04	5.13E-08	3.92E-03
1485	467700.00	3782360.00	4.72E-07	1.02E-02	1.00E-03	4.81E-08	3.67E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1486	465700.00	3782410.00	2.98E-07	6.43E-03	0	3.04E-08	2.32E-03
1487	465750.00	3782410.00	3.01E-07	6.49E-03	0	3.07E-08	2.34E-03
1488	465800.00	3782410.00	3.07E-07	6.63E-03	1.48E-04	3.13E-08	2.39E-03
1489	465850.00	3782410.00	3.10E-07	6.69E-03	8.82E-05	3.16E-08	2.41E-03
1490	467550.00	3782410.00	4.81E-07	1.04E-02	0	4.90E-08	3.74E-03
1491	467600.00	3782410.00	4.59E-07	9.90E-03	3.84E-04	4.68E-08	3.57E-03
1492	467650.00	3782410.00	4.15E-07	8.94E-03	2.18E-04	4.23E-08	3.23E-03
1493	467700.00	3782410.00	4.03E-07	8.69E-03	6.88E-04	4.11E-08	3.14E-03
1494	465700.00	3782460.00	2.71E-07	5.84E-03	1.32E-04	2.76E-08	2.11E-03
1495	465750.00	3782460.00	2.72E-07	5.86E-03	1.64E-04	2.77E-08	2.12E-03
1496	465800.00	3782460.00	2.72E-07	5.87E-03	8.42E-05	2.77E-08	2.12E-03
1497	465850.00	3782460.00	2.68E-07	5.78E-03	2.42E-05	2.73E-08	2.09E-03
1498	467550.00	3782460.00	3.68E-07	7.94E-03	7.26E-05	3.76E-08	2.87E-03
1499	467600.00	3782460.00	4.04E-07	8.71E-03	4.40E-05	4.12E-08	3.14E-03
1500	467650.00	3782460.00	3.56E-07	7.68E-03	4.90E-04	3.63E-08	2.77E-03
1501	467700.00	3782460.00	3.51E-07	7.56E-03	3.39E-04	3.57E-08	2.73E-03
1502	465700.00	3782510.00	2.40E-07	5.17E-03	1.35E-04	2.44E-08	1.87E-03
1503	465750.00	3782510.00	2.38E-07	5.13E-03	3.17E-05	2.42E-08	1.85E-03
1504	465800.00	3782510.00	2.33E-07	5.02E-03	0	2.37E-08	1.81E-03
1505	465850.00	3782510.00	2.25E-07	4.84E-03	0	2.29E-08	1.75E-03
1506	465900.00	3782510.00	2.14E-07	4.60E-03	0	2.18E-08	1.66E-03
1507	465950.00	3782510.00	2.00E-07	4.31E-03	1.33E-04	2.04E-08	1.56E-03
1508	466000.00	3782510.00	1.84E-07	3.96E-03	4.36E-04	1.87E-08	1.43E-03
1509	466050.00	3782510.00	1.68E-07	3.62E-03	4.26E-04	1.71E-08	1.31E-03
1510	466100.00	3782510.00	1.52E-07	3.28E-03	3.69E-04	1.55E-08	1.18E-03
1511	466150.00	3782510.00	1.38E-07	2.98E-03	2.94E-05	1.41E-08	1.08E-03
1512	466200.00	3782510.00	1.27E-07	2.74E-03	3.59E-05	1.30E-08	9.90E-04
1513	466250.00	3782510.00	1.20E-07	2.59E-03	8.87E-06	1.23E-08	9.36E-04
1514	466300.00	3782510.00	1.17E-07	2.52E-03	0	1.19E-08	9.11E-04
1515	466350.00	3782510.00	1.16E-07	2.50E-03	4.76E-04	1.18E-08	9.02E-04
1516	466850.00	3782510.00	2.04E-07	4.39E-03	2.95E-04	2.08E-08	1.59E-03
1517	466900.00	3782510.00	2.22E-07	4.79E-03	2.92E-04	2.27E-08	1.73E-03
1518	466950.00	3782510.00	2.44E-07	5.27E-03	4.46E-04	2.49E-08	1.90E-03
1519	467000.00	3782510.00	2.57E-07	5.55E-03	7.47E-04	2.62E-08	2.00E-03
1520	467050.00	3782510.00	2.71E-07	5.84E-03	2.27E-04	2.76E-08	2.11E-03
1521	467100.00	3782510.00	2.85E-07	6.13E-03	2.27E-04	2.90E-08	2.21E-03
1522	467150.00	3782510.00	2.98E-07	6.43E-03	9.19E-04	3.04E-08	2.32E-03
1523	467200.00	3782510.00	3.10E-07	6.67E-03	6.00E-04	3.15E-08	2.41E-03
1524	467250.00	3782510.00	3.20E-07	6.90E-03	5.02E-04	3.26E-08	2.49E-03
1525	467300.00	3782510.00	3.49E-07	7.51E-03	4.43E-04	3.55E-08	2.71E-03
1526	467350.00	3782510.00	3.43E-07	7.40E-03	4.19E-04	3.50E-08	2.67E-03
1527	467400.00	3782510.00	3.40E-07	7.33E-03	4.58E-04	3.47E-08	2.65E-03
1528	467450.00	3782510.00	3.43E-07	7.39E-03	1.14E-04	3.50E-08	2.67E-03
1529	467500.00	3782510.00	3.41E-07	7.35E-03	4.36E-04	3.47E-08	2.65E-03
1530	467550.00	3782510.00	3.24E-07	6.98E-03	1.57E-04	3.30E-08	2.52E-03
1531	467600.00	3782510.00	3.03E-07	6.52E-03	0	3.08E-08	2.35E-03
1532	467650.00	3782510.00	2.97E-07	6.40E-03	7.77E-04	3.02E-08	2.31E-03
1533	467700.00	3782510.00	2.94E-07	6.33E-03	0	2.99E-08	2.29E-03
1534	465700.00	3782560.00	2.07E-07	4.46E-03	0	2.11E-08	1.61E-03
1535	465750.00	3782560.00	2.02E-07	4.35E-03	0	2.06E-08	1.57E-03
1536	465800.00	3782560.00	1.93E-07	4.16E-03	0	1.97E-08	1.50E-03
1537	465850.00	3782560.00	1.82E-07	3.93E-03	1.25E-05	1.86E-08	1.42E-03
1538	465900.00	3782560.00	1.69E-07	3.65E-03	2.92E-04	1.72E-08	1.32E-03
1539	465950.00	3782560.00	1.55E-07	3.35E-03	3.92E-04	1.58E-08	1.21E-03
1540	466000.00	3782560.00	1.41E-07	3.04E-03	4.24E-04	1.44E-08	1.10E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1541	466050.00	3782560.00	1.28E-07	2.75E-03	2.39E-04	1.30E-08	9.93E-04
1542	466100.00	3782560.00	1.16E-07	2.50E-03	0	1.18E-08	9.03E-04
1543	466150.00	3782560.00	1.07E-07	2.31E-03	0	1.09E-08	8.36E-04
1544	466200.00	3782560.00	1.02E-07	2.21E-03	0	1.04E-08	7.97E-04
1545	466250.00	3782560.00	1.01E-07	2.18E-03	0	1.03E-08	7.86E-04
1546	466300.00	3782560.00	9.89E-08	2.13E-03	5.29E-04	1.01E-08	7.70E-04
1547	466350.00	3782560.00	1.03E-07	2.21E-03	4.89E-04	1.05E-08	7.99E-04
1548	466400.00	3782560.00	1.06E-07	2.28E-03	1.41E-04	1.08E-08	8.22E-04
1549	466450.00	3782560.00	1.09E-07	2.34E-03	7.48E-05	1.11E-08	8.44E-04
1550	466500.00	3782560.00	1.12E-07	2.41E-03	0	1.14E-08	8.70E-04
1551	466800.00	3782560.00	1.72E-07	3.71E-03	6.51E-04	1.75E-08	1.34E-03
1552	466850.00	3782560.00	1.83E-07	3.95E-03	0	1.87E-08	1.43E-03
1553	466900.00	3782560.00	2.07E-07	4.46E-03	4.35E-04	2.11E-08	1.61E-03
1554	466950.00	3782560.00	2.17E-07	4.68E-03	3.21E-04	2.21E-08	1.69E-03
1555	467000.00	3782560.00	2.29E-07	4.93E-03	9.82E-04	2.33E-08	1.78E-03
1556	467050.00	3782560.00	2.40E-07	5.17E-03	0	2.45E-08	1.87E-03
1557	467100.00	3782560.00	2.51E-07	5.42E-03	4.96E-04	2.56E-08	1.96E-03
1558	467150.00	3782560.00	2.62E-07	5.65E-03	6.31E-04	2.67E-08	2.04E-03
1559	467200.00	3782560.00	2.72E-07	5.86E-03	6.39E-04	2.77E-08	2.12E-03
1560	467250.00	3782560.00	2.90E-07	6.25E-03	4.59E-04	2.96E-08	2.26E-03
1561	467300.00	3782560.00	3.17E-07	6.83E-03	3.41E-04	3.23E-08	2.47E-03
1562	467350.00	3782560.00	2.93E-07	6.31E-03	4.11E-04	2.98E-08	2.28E-03
1563	467400.00	3782560.00	2.99E-07	6.46E-03	3.73E-04	3.05E-08	2.33E-03
1564	467450.00	3782560.00	3.02E-07	6.51E-03	7.90E-05	3.08E-08	2.35E-03
1565	467500.00	3782560.00	2.87E-07	6.19E-03	5.23E-04	2.93E-08	2.24E-03
1566	467550.00	3782560.00	2.72E-07	5.86E-03	3.31E-04	2.77E-08	2.12E-03
1567	467600.00	3782560.00	2.60E-07	5.60E-03	0	2.65E-08	2.02E-03
1568	467650.00	3782560.00	2.58E-07	5.57E-03	8.35E-04	2.63E-08	2.01E-03
1569	467700.00	3782560.00	2.29E-07	4.94E-03	3.01E-04	2.34E-08	1.78E-03
1570	465700.00	3782610.00	1.74E-07	3.76E-03	0	1.78E-08	1.36E-03
1571	465750.00	3782610.00	1.67E-07	3.59E-03	0	1.70E-08	1.30E-03
1572	465800.00	3782610.00	1.56E-07	3.36E-03	1.61E-04	1.59E-08	1.21E-03
1573	465850.00	3782610.00	1.44E-07	3.10E-03	4.11E-04	1.46E-08	1.12E-03
1574	465900.00	3782610.00	1.31E-07	2.83E-03	2.99E-04	1.34E-08	1.02E-03
1575	465950.00	3782610.00	1.19E-07	2.56E-03	3.83E-04	1.21E-08	9.23E-04
1576	466000.00	3782610.00	1.07E-07	2.31E-03	8.49E-05	1.09E-08	8.35E-04
1577	466050.00	3782610.00	9.79E-08	2.11E-03	0	9.98E-09	7.62E-04
1578	466100.00	3782610.00	9.12E-08	1.97E-03	0	9.30E-09	7.10E-04
1579	466150.00	3782610.00	8.81E-08	1.90E-03	0	8.98E-09	6.85E-04
1580	466200.00	3782610.00	8.74E-08	1.89E-03	2.44E-05	8.91E-09	6.81E-04
1581	466250.00	3782610.00	8.66E-08	1.87E-03	5.01E-04	8.83E-09	6.74E-04
1582	466300.00	3782610.00	9.00E-08	1.94E-03	5.45E-04	9.17E-09	7.00E-04
1583	466350.00	3782610.00	9.24E-08	1.99E-03	2.45E-04	9.42E-09	7.19E-04
1584	466400.00	3782610.00	9.41E-08	2.03E-03	1.49E-04	9.60E-09	7.33E-04
1585	466450.00	3782610.00	9.74E-08	2.10E-03	0	9.92E-09	7.58E-04
1586	466500.00	3782610.00	1.01E-07	2.18E-03	4.71E-04	1.03E-08	7.88E-04
1587	466550.00	3782610.00	1.07E-07	2.31E-03	3.19E-04	1.09E-08	8.36E-04
1588	466600.00	3782610.00	1.16E-07	2.50E-03	2.95E-04	1.18E-08	9.02E-04
1589	466650.00	3782610.00	1.26E-07	2.73E-03	1.21E-04	1.29E-08	9.84E-04
1590	466750.00	3782610.00	1.47E-07	3.16E-03	5.98E-04	1.50E-08	1.14E-03
1591	466800.00	3782610.00	1.55E-07	3.33E-03	1.86E-04	1.58E-08	1.20E-03
1592	466850.00	3782610.00	1.75E-07	3.77E-03	1.70E-04	1.78E-08	1.36E-03
1593	466900.00	3782610.00	1.85E-07	3.98E-03	3.61E-04	1.88E-08	1.44E-03
1594	466950.00	3782610.00	1.93E-07	4.16E-03	4.10E-04	1.96E-08	1.50E-03
1595	467000.00	3782610.00	2.03E-07	4.37E-03	6.82E-04	2.07E-08	1.58E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1596	467050.00	3782610.00	2.14E-07	4.61E-03	0	2.18E-08	1.66E-03
1597	467100.00	3782610.00	2.23E-07	4.81E-03	6.93E-04	2.28E-08	1.74E-03
1598	467150.00	3782610.00	2.32E-07	5.01E-03	3.55E-04	2.37E-08	1.81E-03
1599	467200.00	3782610.00	2.43E-07	5.24E-03	6.06E-04	2.48E-08	1.89E-03
1600	467250.00	3782610.00	2.63E-07	5.66E-03	4.17E-04	2.68E-08	2.04E-03
1601	467300.00	3782610.00	2.57E-07	5.54E-03	3.04E-04	2.62E-08	2.00E-03
1602	467350.00	3782610.00	2.58E-07	5.57E-03	3.46E-04	2.63E-08	2.01E-03
1603	467400.00	3782610.00	2.57E-07	5.55E-03	3.69E-04	2.62E-08	2.00E-03
1604	467450.00	3782610.00	2.65E-07	5.71E-03	7.29E-05	2.70E-08	2.06E-03
1605	467500.00	3782610.00	2.43E-07	5.25E-03	6.29E-04	2.48E-08	1.89E-03
1606	467550.00	3782610.00	2.30E-07	4.95E-03	4.14E-04	2.34E-08	1.79E-03
1607	467600.00	3782610.00	2.22E-07	4.79E-03	0	2.26E-08	1.73E-03
1608	467650.00	3782610.00	2.03E-07	4.38E-03	6.35E-04	2.07E-08	1.58E-03
1609	467700.00	3782610.00	2.20E-07	4.75E-03	4.07E-04	2.24E-08	1.71E-03
1610	465700.00	3782660.00	1.43E-07	3.09E-03	7.35E-05	1.46E-08	1.12E-03
1611	465750.00	3782660.00	1.34E-07	2.88E-03	2.76E-04	1.36E-08	1.04E-03
1612	465800.00	3782660.00	1.23E-07	2.64E-03	3.27E-04	1.25E-08	9.54E-04
1613	465850.00	3782660.00	1.11E-07	2.39E-03	2.65E-04	1.13E-08	8.64E-04
1614	465900.00	3782660.00	1.00E-07	2.16E-03	2.85E-04	1.02E-08	7.79E-04
1615	465950.00	3782660.00	9.04E-08	1.95E-03	4.49E-05	9.21E-09	7.04E-04
1616	466000.00	3782660.00	8.28E-08	1.78E-03	0	8.44E-09	6.44E-04
1617	466050.00	3782660.00	7.80E-08	1.68E-03	4.76E-06	7.95E-09	6.07E-04
1618	466100.00	3782660.00	7.58E-08	1.64E-03	0	7.73E-09	5.90E-04
1619	466150.00	3782660.00	7.60E-08	1.64E-03	9.38E-05	7.74E-09	5.91E-04
1620	466200.00	3782660.00	7.73E-08	1.67E-03	4.42E-04	7.88E-09	6.02E-04
1621	466250.00	3782660.00	7.99E-08	1.72E-03	5.69E-04	8.14E-09	6.22E-04
1622	466300.00	3782660.00	8.22E-08	1.77E-03	2.42E-04	8.38E-09	6.40E-04
1623	466350.00	3782660.00	8.39E-08	1.81E-03	7.27E-05	8.55E-09	6.53E-04
1624	466400.00	3782660.00	8.53E-08	1.84E-03	0	8.69E-09	6.64E-04
1625	466450.00	3782660.00	8.73E-08	1.88E-03	5.21E-04	8.90E-09	6.79E-04
1626	466500.00	3782660.00	9.15E-08	1.97E-03	3.05E-04	9.33E-09	7.12E-04
1627	466550.00	3782660.00	9.84E-08	2.12E-03	2.57E-04	1.00E-08	7.65E-04
1628	466600.00	3782660.00	1.08E-07	2.33E-03	1.27E-04	1.10E-08	8.41E-04
1629	466650.00	3782660.00	1.18E-07	2.54E-03	2.98E-04	1.20E-08	9.16E-04
1630	466700.00	3782660.00	1.27E-07	2.73E-03	5.86E-04	1.29E-08	9.85E-04
1631	466750.00	3782660.00	1.33E-07	2.87E-03	5.47E-04	1.36E-08	1.03E-03
1632	466800.00	3782660.00	1.40E-07	3.02E-03	8.31E-05	1.43E-08	1.09E-03
1633	466850.00	3782660.00	1.54E-07	3.32E-03	4.89E-04	1.57E-08	1.20E-03
1634	466900.00	3782660.00	1.64E-07	3.54E-03	2.27E-04	1.68E-08	1.28E-03
1635	466950.00	3782660.00	1.71E-07	3.68E-03	7.34E-04	1.74E-08	1.33E-03
1636	467000.00	3782660.00	1.80E-07	3.87E-03	2.18E-04	1.83E-08	1.40E-03
1637	467050.00	3782660.00	1.89E-07	4.08E-03	0	1.93E-08	1.47E-03
1638	467100.00	3782660.00	1.99E-07	4.30E-03	8.24E-04	2.03E-08	1.55E-03
1639	467150.00	3782660.00	2.08E-07	4.47E-03	1.46E-04	2.11E-08	1.61E-03
1640	467200.00	3782660.00	2.19E-07	4.72E-03	5.11E-04	2.23E-08	1.70E-03
1641	467250.00	3782660.00	2.16E-07	4.66E-03	4.74E-04	2.20E-08	1.68E-03
1642	467300.00	3782660.00	2.04E-07	4.39E-03	3.34E-04	2.08E-08	1.59E-03
1643	467350.00	3782660.00	2.06E-07	4.45E-03	5.27E-04	2.10E-08	1.61E-03
1644	467400.00	3782660.00	2.03E-07	4.37E-03	5.48E-04	2.07E-08	1.58E-03
1645	467450.00	3782660.00	2.13E-07	4.58E-03	3.26E-04	2.17E-08	1.65E-03
1646	467500.00	3782660.00	2.12E-07	4.57E-03	5.27E-04	2.16E-08	1.65E-03
1647	467550.00	3782660.00	1.91E-07	4.11E-03	4.88E-04	1.95E-08	1.49E-03
1648	467600.00	3782660.00	1.82E-07	3.93E-03	0	1.86E-08	1.42E-03
1649	467650.00	3782660.00	1.97E-07	4.25E-03	1.87E-05	2.01E-08	1.53E-03
1650	467700.00	3782660.00	1.98E-07	4.26E-03	5.41E-04	2.01E-08	1.54E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1651	464900.00	3779360.00	-8.10E-09	0	0	-9.25E-10	0
1652	465000.00	3779360.00	-8.83E-09	0	0	-1.01E-09	0
1653	465100.00	3779360.00	-9.60E-09	0	0	-1.10E-09	0
1654	465200.00	3779360.00	-1.04E-08	0	0	-1.19E-09	0
1655	465300.00	3779360.00	-1.13E-08	0	0	-1.29E-09	0
1656	465400.00	3779360.00	-1.23E-08	0	3.82E-05	-1.41E-09	0
1657	465500.00	3779360.00	-1.33E-08	0	0	-1.52E-09	0
1658	465600.00	3779360.00	-1.44E-08	0	0	-1.64E-09	0
1659	465700.00	3779360.00	-1.55E-08	0	0	-1.77E-09	0
1660	465800.00	3779360.00	-1.66E-08	0	0	-1.90E-09	0
1661	465900.00	3779360.00	-1.78E-08	0	0	-2.04E-09	0
1662	466000.00	3779360.00	-1.90E-08	0	0	-2.17E-09	0
1663	466100.00	3779360.00	-2.00E-08	0	0	-2.29E-09	0
1664	466200.00	3779360.00	-2.14E-08	0	0	-2.45E-09	0
1665	466300.00	3779360.00	-2.28E-08	0	0	-2.61E-09	0
1666	466400.00	3779360.00	-2.42E-08	0	0	-2.76E-09	0
1667	466500.00	3779360.00	-2.55E-08	0	0	-2.91E-09	0
1668	466600.00	3779360.00	-2.68E-08	0	3.05E-05	-3.06E-09	0
1669	466700.00	3779360.00	-2.84E-08	0	0	-3.24E-09	0
1670	466800.00	3779360.00	-2.96E-08	0	0	-3.38E-09	0
1671	466900.00	3779360.00	-3.06E-08	0	0	-3.49E-09	0
1672	467000.00	3779360.00	-3.14E-08	0	0	-3.59E-09	0
1673	467100.00	3779360.00	-3.21E-08	0	0	-3.66E-09	0
1674	467200.00	3779360.00	-3.25E-08	0	0	-3.71E-09	0
1675	467300.00	3779360.00	-3.28E-08	0	0	-3.74E-09	0
1676	467400.00	3779360.00	-3.28E-08	0	0	-3.75E-09	0
1677	467500.00	3779360.00	-3.26E-08	0	0	-3.72E-09	0
1678	467600.00	3779360.00	-3.21E-08	0	0	-3.67E-09	0
1679	467700.00	3779360.00	-3.15E-08	0	0	-3.59E-09	0
1680	467800.00	3779360.00	-3.06E-08	0	0	-3.50E-09	0
1681	467900.00	3779360.00	-2.96E-08	0	0	-3.38E-09	0
1682	468000.00	3779360.00	-2.85E-08	0	1.31E-05	-3.26E-09	0
1683	468100.00	3779360.00	-2.73E-08	0	0	-3.12E-09	0
1684	468200.00	3779360.00	-2.60E-08	0	0	-2.97E-09	0
1685	468300.00	3779360.00	-2.47E-08	0	0	-2.82E-09	0
1686	468400.00	3779360.00	-2.34E-08	0	0	-2.67E-09	0
1687	468500.00	3779360.00	-2.20E-08	0	0	-2.52E-09	0
1688	464900.00	3779460.00	-8.26E-09	0	0	-9.44E-10	0
1689	465000.00	3779460.00	-9.04E-09	0	0	-1.03E-09	0
1690	465100.00	3779460.00	-9.88E-09	0	0	-1.13E-09	0
1691	465200.00	3779460.00	-1.08E-08	0	0	-1.23E-09	0
1692	465300.00	3779460.00	-1.18E-08	0	0	-1.34E-09	0
1693	465400.00	3779460.00	-1.28E-08	0	0	-1.47E-09	0
1694	465500.00	3779460.00	-1.40E-08	0	4.71E-05	-1.60E-09	0
1695	465600.00	3779460.00	-1.52E-08	0	0	-1.73E-09	0
1696	465700.00	3779460.00	-1.65E-08	0	0	-1.88E-09	0
1697	465800.00	3779460.00	-1.79E-08	0	0	-2.04E-09	0
1698	465900.00	3779460.00	-1.93E-08	0	0	-2.20E-09	0
1699	466000.00	3779460.00	-2.05E-08	0	0	-2.34E-09	0
1700	466100.00	3779460.00	-2.18E-08	0	0	-2.48E-09	0
1701	466200.00	3779460.00	-2.34E-08	0	0	-2.67E-09	0
1702	466300.00	3779460.00	-2.50E-08	0	0	-2.86E-09	0
1703	466400.00	3779460.00	-2.69E-08	0	0	-3.08E-09	0
1704	466500.00	3779460.00	-2.82E-08	0	0	-3.22E-09	0
1705	466600.00	3779460.00	-2.99E-08	0	2.71E-05	-3.41E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1706	466700.00	3779460.00	-3.17E-08	0	0	-3.62E-09	0
1707	466800.00	3779460.00	-3.31E-08	0	0	-3.78E-09	0
1708	466900.00	3779460.00	-3.44E-08	0	0	-3.93E-09	0
1709	467000.00	3779460.00	-3.54E-08	0	0	-4.05E-09	0
1710	467100.00	3779460.00	-3.62E-08	0	0	-4.13E-09	0
1711	467200.00	3779460.00	-3.68E-08	0	0	-4.20E-09	0
1712	467300.00	3779460.00	-3.71E-08	0	0	-4.24E-09	0
1713	467400.00	3779460.00	-3.71E-08	0	0	-4.24E-09	0
1714	467500.00	3779460.00	-3.69E-08	0	0	-4.21E-09	0
1715	467600.00	3779460.00	-3.63E-08	0	0	-4.15E-09	0
1716	467700.00	3779460.00	-3.55E-08	0	0	-4.05E-09	0
1717	467800.00	3779460.00	-3.44E-08	0	0	-3.93E-09	0
1718	467900.00	3779460.00	-3.32E-08	0	2.20E-06	-3.80E-09	0
1719	468000.00	3779460.00	-3.19E-08	0	7.16E-06	-3.64E-09	0
1720	468100.00	3779460.00	-3.04E-08	0	0	-3.47E-09	0
1721	468200.00	3779460.00	-2.89E-08	0	0	-3.30E-09	0
1722	468300.00	3779460.00	-2.73E-08	0	0	-3.12E-09	0
1723	468400.00	3779460.00	-2.57E-08	0	0	-2.94E-09	0
1724	468500.00	3779460.00	-2.41E-08	0	0	-2.76E-09	0
1725	464900.00	3779560.00	-8.36E-09	0	0	-9.55E-10	0
1726	465000.00	3779560.00	-9.20E-09	0	0	-1.05E-09	0
1727	465100.00	3779560.00	-1.01E-08	0	0	-1.16E-09	0
1728	465200.00	3779560.00	-1.11E-08	0	0	-1.27E-09	0
1729	465300.00	3779560.00	-1.22E-08	0	0	-1.39E-09	0
1730	465400.00	3779560.00	-1.34E-08	0	0	-1.53E-09	0
1731	465500.00	3779560.00	-1.46E-08	0	1.25E-05	-1.67E-09	0
1732	465600.00	3779560.00	-1.60E-08	0	4.99E-05	-1.82E-09	0
1733	465700.00	3779560.00	-1.75E-08	0	0	-1.99E-09	0
1734	465800.00	3779560.00	-1.91E-08	0	0	-2.18E-09	0
1735	465900.00	3779560.00	-2.05E-08	0	0	-2.34E-09	0
1736	466000.00	3779560.00	-2.21E-08	0	0	-2.52E-09	0
1737	466100.00	3779560.00	-2.37E-08	0	0	-2.70E-09	0
1738	466200.00	3779560.00	-2.57E-08	0	0	-2.94E-09	0
1739	466300.00	3779560.00	-2.78E-08	0	0	-3.17E-09	0
1740	466400.00	3779560.00	-2.98E-08	0	0	-3.40E-09	0
1741	466500.00	3779560.00	-3.14E-08	0	0	-3.58E-09	0
1742	466600.00	3779560.00	-3.37E-08	0	0	-3.85E-09	0
1743	466700.00	3779560.00	-3.55E-08	0	7.38E-06	-4.06E-09	0
1744	466800.00	3779560.00	-3.73E-08	0	0	-4.26E-09	0
1745	466900.00	3779560.00	-3.88E-08	0	0	-4.44E-09	0
1746	467000.00	3779560.00	-4.01E-08	0	0	-4.58E-09	0
1747	467100.00	3779560.00	-4.12E-08	0	0	-4.70E-09	0
1748	467200.00	3779560.00	-4.19E-08	0	0	-4.78E-09	0
1749	467300.00	3779560.00	-4.23E-08	0	0	-4.83E-09	0
1750	467400.00	3779560.00	-4.23E-08	0	0	-4.83E-09	0
1751	467500.00	3779560.00	-4.20E-08	0	0	-4.79E-09	0
1752	467600.00	3779560.00	-4.13E-08	0	0	-4.71E-09	0
1753	467700.00	3779560.00	-4.02E-08	0	0	-4.59E-09	0
1754	467800.00	3779560.00	-3.89E-08	0	0	-4.45E-09	0
1755	467900.00	3779560.00	-3.74E-08	0	7.08E-06	-4.28E-09	0
1756	468000.00	3779560.00	-3.58E-08	0	0	-4.09E-09	0
1757	468100.00	3779560.00	-3.40E-08	0	0	-3.88E-09	0
1758	468200.00	3779560.00	-3.21E-08	0	0	-3.67E-09	0
1759	468300.00	3779560.00	-3.02E-08	0	0	-3.45E-09	0
1760	468400.00	3779560.00	-2.83E-08	0	0	-3.24E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1761	468500.00	3779560.00	-2.65E-08	0	2.01E-05	-3.02E-09	0
1762	464900.00	3779660.00	-8.45E-09	0	0	-9.65E-10	0
1763	465000.00	3779660.00	-9.33E-09	0	0	-1.07E-09	0
1764	465100.00	3779660.00	-1.03E-08	0	0	-1.18E-09	0
1765	465200.00	3779660.00	-1.14E-08	0	0	-1.30E-09	0
1766	465300.00	3779660.00	-1.26E-08	0	0	-1.44E-09	0
1767	465400.00	3779660.00	-1.39E-08	0	0	-1.58E-09	0
1768	465500.00	3779660.00	-1.52E-08	0	0	-1.74E-09	0
1769	465600.00	3779660.00	-1.68E-08	0	2.52E-05	-1.92E-09	0
1770	465700.00	3779660.00	-1.85E-08	0	4.39E-05	-2.12E-09	0
1771	465800.00	3779660.00	-2.02E-08	0	0	-2.31E-09	0
1772	465900.00	3779660.00	-2.20E-08	0	0	-2.51E-09	0
1773	466000.00	3779660.00	-2.41E-08	0	0	-2.76E-09	0
1774	466100.00	3779660.00	-2.61E-08	0	0	-2.98E-09	0
1775	466200.00	3779660.00	-2.82E-08	0	0	-3.22E-09	0
1776	466300.00	3779660.00	-3.07E-08	0	0	-3.50E-09	0
1777	466400.00	3779660.00	-3.30E-08	0	0	-3.77E-09	0
1778	466500.00	3779660.00	-3.49E-08	0	0	-3.99E-09	0
1779	466600.00	3779660.00	-3.77E-08	0	0	-4.30E-09	0
1780	466700.00	3779660.00	-4.00E-08	0	3.57E-05	-4.57E-09	0
1781	466800.00	3779660.00	-4.21E-08	0	0	-4.81E-09	0
1782	466900.00	3779660.00	-4.41E-08	0	0	-5.04E-09	0
1783	467000.00	3779660.00	-4.58E-08	0	0	-5.23E-09	0
1784	467100.00	3779660.00	-4.71E-08	0	0	-5.38E-09	0
1785	467200.00	3779660.00	-4.80E-08	0	0	-5.48E-09	0
1786	467300.00	3779660.00	-4.85E-08	0	0	-5.54E-09	0
1787	467400.00	3779660.00	-4.85E-08	0	0	-5.54E-09	0
1788	467500.00	3779660.00	-4.81E-08	0	0	-5.50E-09	0
1789	467600.00	3779660.00	-4.72E-08	0	0	-5.39E-09	0
1790	467700.00	3779660.00	-4.59E-08	0	0	-5.24E-09	0
1791	467800.00	3779660.00	-4.43E-08	0	0	-5.06E-09	0
1792	467900.00	3779660.00	-4.24E-08	0	1.28E-05	-4.84E-09	0
1793	468000.00	3779660.00	-4.04E-08	0	0	-4.61E-09	0
1794	468100.00	3779660.00	-3.82E-08	0	0	-4.36E-09	0
1795	468200.00	3779660.00	-3.59E-08	0	0	-4.10E-09	0
1796	468300.00	3779660.00	-3.36E-08	0	0	-3.84E-09	0
1797	468400.00	3779660.00	-3.13E-08	0	0	-3.57E-09	0
1798	468500.00	3779660.00	-2.91E-08	0	4.93E-05	-3.32E-09	0
1799	464900.00	3779760.00	-8.51E-09	0	0	-9.72E-10	0
1800	465000.00	3779760.00	-9.42E-09	0	0	-1.08E-09	0
1801	465100.00	3779760.00	-1.05E-08	0	0	-1.19E-09	0
1802	465200.00	3779760.00	-1.16E-08	0	0	-1.33E-09	0
1803	465300.00	3779760.00	-1.29E-08	0	0	-1.47E-09	0
1804	465400.00	3779760.00	-1.43E-08	0	0	-1.63E-09	0
1805	465500.00	3779760.00	-1.59E-08	0	0	-1.81E-09	0
1806	465600.00	3779760.00	-1.76E-08	0	0	-2.01E-09	0
1807	465700.00	3779760.00	-1.95E-08	0	3.42E-05	-2.23E-09	0
1808	465800.00	3779760.00	-2.15E-08	0	3.10E-05	-2.45E-09	0
1809	465900.00	3779760.00	-2.36E-08	0	0	-2.70E-09	0
1810	466000.00	3779760.00	-2.60E-08	0	0	-2.97E-09	0
1811	466100.00	3779760.00	-2.84E-08	0	0	-3.24E-09	0
1812	466200.00	3779760.00	-3.09E-08	0	0	-3.53E-09	0
1813	466300.00	3779760.00	-3.39E-08	0	0	-3.87E-09	0
1814	466400.00	3779760.00	-3.66E-08	0	0	-4.18E-09	0
1815	466500.00	3779760.00	-3.92E-08	0	0	-4.48E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1816	466600.00	3779760.00	-4.24E-08	0	0	-4.84E-09	0
1817	466700.00	3779760.00	-4.52E-08	0	5.01E-05	-5.16E-09	0
1818	466800.00	3779760.00	-4.79E-08	0	0	-5.47E-09	0
1819	466900.00	3779760.00	-5.04E-08	0	0	-5.76E-09	0
1820	467000.00	3779760.00	-5.25E-08	0	0	-6.00E-09	0
1821	467100.00	3779760.00	-5.42E-08	0	0	-6.19E-09	0
1822	467200.00	3779760.00	-5.54E-08	0	0	-6.33E-09	0
1823	467300.00	3779760.00	-5.61E-08	0	0	-6.40E-09	0
1824	467400.00	3779760.00	-5.61E-08	0	0	-6.41E-09	0
1825	467500.00	3779760.00	-5.56E-08	0	0	-6.35E-09	0
1826	467600.00	3779760.00	-5.44E-08	0	0	-6.22E-09	0
1827	467700.00	3779760.00	-5.27E-08	0	0	-6.02E-09	0
1828	467800.00	3779760.00	-5.07E-08	0	0	-5.79E-09	0
1829	467900.00	3779760.00	-4.84E-08	0	2.64E-06	-5.52E-09	0
1830	468000.00	3779760.00	-4.58E-08	0	0	-5.23E-09	0
1831	468100.00	3779760.00	-4.30E-08	0	0	-4.92E-09	0
1832	468200.00	3779760.00	-4.02E-08	0	0	-4.59E-09	0
1833	468300.00	3779760.00	-3.74E-08	0	0	-4.27E-09	0
1834	468400.00	3779760.00	-3.47E-08	0	2.65E-05	-3.96E-09	0
1835	468500.00	3779760.00	-3.20E-08	0	7.68E-05	-3.66E-09	0
1836	464900.00	3779860.00	-8.54E-09	0	0	-9.75E-10	0
1837	465000.00	3779860.00	-9.49E-09	0	0	-1.08E-09	0
1838	465100.00	3779860.00	-1.06E-08	0	0	-1.21E-09	0
1839	465200.00	3779860.00	-1.18E-08	0	0	-1.35E-09	0
1840	465300.00	3779860.00	-1.32E-08	0	0	-1.50E-09	0
1841	465400.00	3779860.00	-1.47E-08	0	0	-1.68E-09	0
1842	465500.00	3779860.00	-1.65E-08	0	0	-1.88E-09	0
1843	465600.00	3779860.00	-1.84E-08	0	0	-2.10E-09	0
1844	465700.00	3779860.00	-2.04E-08	0	0	-2.33E-09	0
1845	465800.00	3779860.00	-2.27E-08	0	5.76E-05	-2.59E-09	0
1846	465900.00	3779860.00	-2.54E-08	0	1.25E-05	-2.90E-09	0
1847	466000.00	3779860.00	-2.80E-08	0	0	-3.20E-09	0
1848	466100.00	3779860.00	-3.09E-08	0	0	-3.53E-09	0
1849	466200.00	3779860.00	-3.40E-08	0	0	-3.88E-09	0
1850	466300.00	3779860.00	-3.74E-08	0	0	-4.28E-09	0
1851	466400.00	3779860.00	-4.05E-08	0	0	-4.62E-09	0
1852	466500.00	3779860.00	-4.44E-08	0	0	-5.07E-09	0
1853	466600.00	3779860.00	-4.79E-08	0	0	-5.47E-09	0
1854	466700.00	3779860.00	-5.14E-08	0	0	-5.87E-09	0
1855	466800.00	3779860.00	-5.48E-08	0	0	-6.26E-09	0
1856	466900.00	3779860.00	-5.80E-08	0	0	-6.62E-09	0
1857	467000.00	3779860.00	-6.08E-08	0	0	-6.94E-09	0
1858	467100.00	3779860.00	-6.30E-08	0	0	-7.19E-09	0
1859	467200.00	3779860.00	-6.45E-08	0	0	-7.37E-09	0
1860	467300.00	3779860.00	-6.53E-08	0	0	-7.46E-09	0
1861	467400.00	3779860.00	-6.54E-08	0	0	-7.47E-09	0
1862	467500.00	3779860.00	-6.47E-08	0	0	-7.39E-09	0
1863	467600.00	3779860.00	-6.32E-08	0	0	-7.22E-09	0
1864	467700.00	3779860.00	-6.11E-08	0	0	-6.98E-09	0
1865	467800.00	3779860.00	-5.85E-08	0	0	-6.68E-09	0
1866	467900.00	3779860.00	-5.55E-08	0	0	-6.34E-09	0
1867	468000.00	3779860.00	-5.22E-08	0	0	-5.96E-09	0
1868	468100.00	3779860.00	-4.87E-08	0	0	-5.56E-09	0
1869	468200.00	3779860.00	-4.52E-08	0	0	-5.17E-09	0
1870	468300.00	3779860.00	-4.19E-08	0	0	-4.78E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1871	468400.00	3779860.00	-3.85E-08	0	6.49E-05	-4.39E-09	0
1872	468500.00	3779860.00	-3.53E-08	0	8.69E-05	-4.03E-09	0
1873	464900.00	3779960.00	-8.57E-09	0	0	-9.79E-10	0
1874	465000.00	3779960.00	-9.53E-09	0	0	-1.09E-09	0
1875	465100.00	3779960.00	-1.06E-08	0	0	-1.21E-09	0
1876	465200.00	3779960.00	-1.19E-08	0	0	-1.36E-09	0
1877	465300.00	3779960.00	-1.34E-08	0	0	-1.52E-09	0
1878	465400.00	3779960.00	-1.50E-08	0	0	-1.71E-09	0
1879	465500.00	3779960.00	-1.69E-08	0	0	-1.93E-09	0
1880	465600.00	3779960.00	-1.90E-08	0	0	-2.17E-09	0
1881	465700.00	3779960.00	-2.13E-08	0	0	-2.43E-09	0
1882	465800.00	3779960.00	-2.39E-08	0	0	-2.73E-09	0
1883	465900.00	3779960.00	-2.69E-08	0	8.05E-05	-3.08E-09	0
1884	466000.00	3779960.00	-3.01E-08	0	0	-3.44E-09	0
1885	466100.00	3779960.00	-3.37E-08	0	0	-3.85E-09	0
1886	466200.00	3779960.00	-3.76E-08	0	0	-4.29E-09	0
1887	466300.00	3779960.00	-4.14E-08	0	0	-4.73E-09	0
1888	466400.00	3779960.00	-4.51E-08	0	0	-5.15E-09	0
1889	466500.00	3779960.00	-4.99E-08	0	0	-5.70E-09	0
1890	466600.00	3779960.00	-5.43E-08	0	0	-6.20E-09	0
1891	466700.00	3779960.00	-5.88E-08	0	0	-6.71E-09	0
1892	466800.00	3779960.00	-6.31E-08	0	4.70E-05	-7.20E-09	0
1893	466900.00	3779960.00	-6.72E-08	0	0	-7.67E-09	0
1894	467000.00	3779960.00	-7.09E-08	0	0	-8.10E-09	0
1895	467100.00	3779960.00	-7.38E-08	0	0	-8.43E-09	0
1896	467200.00	3779960.00	-7.58E-08	0	0	-8.66E-09	0
1897	467300.00	3779960.00	-7.69E-08	0	0	-8.79E-09	0
1898	467400.00	3779960.00	-7.71E-08	0	0	-8.80E-09	0
1899	467500.00	3779960.00	-7.61E-08	0	0	-8.69E-09	0
1900	467600.00	3779960.00	-7.41E-08	0	0	-8.46E-09	0
1901	467700.00	3779960.00	-7.14E-08	0	0	-8.15E-09	0
1902	467800.00	3779960.00	-6.79E-08	0	6.75E-06	-7.76E-09	0
1903	467900.00	3779960.00	-6.40E-08	0	0	-7.31E-09	0
1904	468000.00	3779960.00	-5.98E-08	0	0	-6.83E-09	0
1905	468100.00	3779960.00	-5.55E-08	0	0	-6.34E-09	0
1906	468200.00	3779960.00	-5.12E-08	0	0	-5.85E-09	0
1907	468300.00	3779960.00	-4.69E-08	0	3.75E-05	-5.36E-09	0
1908	468400.00	3779960.00	-4.28E-08	0	1.00E-04	-4.89E-09	0
1909	468500.00	3779960.00	-3.90E-08	0	0	-4.46E-09	0
1910	464900.00	3780060.00	-8.56E-09	0	0	-9.77E-10	0
1911	465000.00	3780060.00	-9.54E-09	0	0	-1.09E-09	0
1912	465100.00	3780060.00	-1.07E-08	0	0	-1.22E-09	0
1913	465200.00	3780060.00	-1.20E-08	0	0	-1.37E-09	0
1914	465300.00	3780060.00	-1.35E-08	0	0	-1.54E-09	0
1915	465400.00	3780060.00	-1.52E-08	0	0	-1.74E-09	0
1916	465500.00	3780060.00	-1.73E-08	0	0	-1.97E-09	0
1917	465600.00	3780060.00	-1.96E-08	0	0	-2.24E-09	0
1918	465700.00	3780060.00	-2.22E-08	0	0	-2.53E-09	0
1919	465800.00	3780060.00	-2.51E-08	0	0	-2.87E-09	0
1920	465900.00	3780060.00	-2.85E-08	0	0	-3.26E-09	0
1921	466000.00	3780060.00	-3.23E-08	0	1.09E-04	-3.69E-09	0
1922	466100.00	3780060.00	-3.66E-08	0	0	-4.18E-09	0
1923	466200.00	3780060.00	-4.11E-08	0	0	-4.69E-09	0
1924	466300.00	3780060.00	-4.59E-08	0	0	-5.24E-09	0
1925	466400.00	3780060.00	-5.05E-08	0	0	-5.76E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1926	466500.00	3780060.00	-5.63E-08	0	0	-6.43E-09	0
1927	466600.00	3780060.00	-6.18E-08	0	0	-7.06E-09	0
1928	466700.00	3780060.00	-6.75E-08	0	0	-7.71E-09	0
1929	466800.00	3780060.00	-7.31E-08	0	9.74E-05	-8.34E-09	0
1930	466900.00	3780060.00	-7.85E-08	0	0	-8.96E-09	0
1931	467000.00	3780060.00	-8.34E-08	0	0	-9.52E-09	0
1932	467100.00	3780060.00	-8.73E-08	0	0	-9.97E-09	0
1933	467200.00	3780060.00	-9.01E-08	0	0	-1.03E-08	0
1934	467300.00	3780060.00	-9.16E-08	0	0	-1.05E-08	0
1935	467400.00	3780060.00	-9.17E-08	0	0	-1.05E-08	0
1936	467500.00	3780060.00	-9.04E-08	0	0	-1.03E-08	0
1937	467600.00	3780060.00	-8.78E-08	0	0	-1.00E-08	0
1938	467700.00	3780060.00	-8.42E-08	0	0	-9.61E-09	0
1939	467800.00	3780060.00	-7.96E-08	0	0	-9.09E-09	0
1940	467900.00	3780060.00	-7.45E-08	0	0	-8.51E-09	0
1941	468000.00	3780060.00	-6.99E-08	0	0	-7.99E-09	0
1942	468100.00	3780060.00	-6.40E-08	0	0	-7.31E-09	0
1943	468200.00	3780060.00	-5.81E-08	0	0	-6.63E-09	0
1944	468300.00	3780060.00	-5.28E-08	0	8.98E-05	-6.03E-09	0
1945	468400.00	3780060.00	-4.78E-08	0	4.26E-05	-5.46E-09	0
1946	468500.00	3780060.00	-4.32E-08	0	0	-4.94E-09	0
1947	464900.00	3780160.00	-8.53E-09	0	0	-9.74E-10	0
1948	465000.00	3780160.00	-9.53E-09	0	0	-1.09E-09	0
1949	465100.00	3780160.00	-1.07E-08	0	0	-1.22E-09	0
1950	465200.00	3780160.00	-1.20E-08	0	0	-1.37E-09	0
1951	465300.00	3780160.00	-1.36E-08	0	0	-1.55E-09	0
1952	465400.00	3780160.00	-1.54E-08	0	0	-1.76E-09	0
1953	465500.00	3780160.00	-1.75E-08	0	0	-2.00E-09	0
1954	465600.00	3780160.00	-2.00E-08	0	0	-2.29E-09	0
1955	467800.00	3780160.00	-9.41E-08	0	0	-1.07E-08	0
1956	467900.00	3780160.00	-8.73E-08	0	0	-9.97E-09	0
1957	468000.00	3780160.00	-8.09E-08	0	0	-9.24E-09	0
1958	468100.00	3780160.00	-7.39E-08	0	0	-8.44E-09	0
1959	468200.00	3780160.00	-6.61E-08	0	5.70E-05	-7.55E-09	0
1960	468300.00	3780160.00	-5.95E-08	0	1.36E-04	-6.80E-09	0
1961	468400.00	3780160.00	-5.34E-08	0	0	-6.10E-09	0
1962	468500.00	3780160.00	-4.79E-08	0	0	-5.47E-09	0
1963	464900.00	3780260.00	-8.42E-09	0	0	-9.61E-10	0
1964	465000.00	3780260.00	-9.45E-09	0	0	-1.08E-09	0
1965	465100.00	3780260.00	-1.06E-08	0	0	-1.22E-09	0
1966	465200.00	3780260.00	-1.20E-08	0	0	-1.37E-09	0
1967	465300.00	3780260.00	-1.36E-08	0	0	-1.55E-09	0
1968	465400.00	3780260.00	-1.55E-08	0	0	-1.77E-09	0
1969	465500.00	3780260.00	-1.77E-08	0	0	-2.02E-09	0
1970	465600.00	3780260.00	-2.03E-08	0	0	-2.32E-09	0
1971	467800.00	3780260.00	-1.12E-07	0	0	-1.28E-08	0
1972	467900.00	3780260.00	-1.03E-07	0	0	-1.18E-08	0
1973	468000.00	3780260.00	-9.40E-08	0	0	-1.07E-08	0
1974	468100.00	3780260.00	-8.47E-08	0	0	-9.67E-09	0
1975	468200.00	3780260.00	-7.56E-08	0	1.30E-04	-8.63E-09	0
1976	468300.00	3780260.00	-6.74E-08	0	0	-7.69E-09	0
1977	468400.00	3780260.00	-5.98E-08	0	0	-6.83E-09	0
1978	468500.00	3780260.00	-5.30E-08	0	0	-6.05E-09	0
1979	464900.00	3780360.00	-8.20E-09	0	0	-9.36E-10	0
1980	465000.00	3780360.00	-9.27E-09	0	0	-1.06E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
1981	465100.00	3780360.00	-1.05E-08	0	0	-1.20E-09	0
1982	465200.00	3780360.00	-1.19E-08	0	0	-1.36E-09	0
1983	465300.00	3780360.00	-1.36E-08	0	0	-1.55E-09	0
1984	465400.00	3780360.00	-1.55E-08	0	0	-1.77E-09	0
1985	465500.00	3780360.00	-1.78E-08	0	0	-2.03E-09	0
1986	465600.00	3780360.00	-2.05E-08	0	0	-2.34E-09	0
1987	467800.00	3780360.00	-1.36E-07	0	0	-1.55E-08	0
1988	467900.00	3780360.00	-1.23E-07	0	0	-1.41E-08	0
1989	468000.00	3780360.00	-1.11E-07	0	0	-1.26E-08	0
1990	468100.00	3780360.00	-9.82E-08	0	9.24E-05	-1.12E-08	0
1991	468200.00	3780360.00	-8.68E-08	0	4.79E-05	-9.91E-09	0
1992	468300.00	3780360.00	-7.64E-08	0	0	-8.72E-09	0
1993	468400.00	3780360.00	-6.71E-08	0	0	-7.66E-09	0
1994	468500.00	3780360.00	-5.88E-08	0	0	-6.71E-09	0
1995	464900.00	3780460.00	-7.87E-09	0	0	-8.99E-10	0
1996	465000.00	3780460.00	-8.95E-09	0	0	-1.02E-09	0
1997	465100.00	3780460.00	-1.02E-08	0	0	-1.17E-09	0
1998	465200.00	3780460.00	-1.17E-08	0	0	-1.33E-09	0
1999	465300.00	3780460.00	-1.34E-08	0	0	-1.53E-09	0
2000	465400.00	3780460.00	-1.54E-08	0	0	-1.75E-09	0
2001	465500.00	3780460.00	-1.77E-08	0	0	-2.02E-09	0
2002	465600.00	3780460.00	-2.05E-08	0	0	-2.35E-09	0
2003	467800.00	3780460.00	-1.66E-07	0	0	-1.90E-08	0
2004	467900.00	3780460.00	-1.49E-07	0	0	-1.70E-08	0
2005	468000.00	3780460.00	-1.31E-07	0	0	-1.50E-08	0
2006	468100.00	3780460.00	-1.15E-07	0	1.99E-04	-1.31E-08	0
2007	468200.00	3780460.00	-9.99E-08	0	0	-1.14E-08	0
2008	468300.00	3780460.00	-8.68E-08	0	0	-9.91E-09	0
2009	468400.00	3780460.00	-7.52E-08	0	0	-8.59E-09	0
2010	468500.00	3780460.00	-6.54E-08	0	7.96E-05	-7.47E-09	0
2011	464900.00	3780560.00	-7.48E-09	0	4.92E-05	-8.54E-10	0
2012	465000.00	3780560.00	-8.53E-09	0	5.07E-05	-9.74E-10	0
2013	465100.00	3780560.00	-9.77E-09	0	1.62E-05	-1.12E-09	0
2014	465200.00	3780560.00	-1.12E-08	0	0	-1.28E-09	0
2015	465300.00	3780560.00	-1.30E-08	0	0	-1.48E-09	0
2016	465400.00	3780560.00	-1.50E-08	0	0	-1.71E-09	0
2017	465500.00	3780560.00	-1.74E-08	0	0	-1.99E-09	0
2018	465600.00	3780560.00	-2.04E-08	0	0	-2.33E-09	0
2019	467800.00	3780560.00	-2.07E-07	0	0	-2.36E-08	0
2020	467900.00	3780560.00	-1.81E-07	0	0	-2.07E-08	0
2021	468000.00	3780560.00	-1.57E-07	0	1.59E-04	-1.79E-08	0
2022	468100.00	3780560.00	-1.35E-07	0	0	-1.54E-08	0
2023	468200.00	3780560.00	-1.15E-07	0	0	-1.32E-08	0
2024	468300.00	3780560.00	-9.87E-08	0	0	-1.13E-08	0
2025	468400.00	3780560.00	-8.47E-08	0	6.94E-05	-9.67E-09	0
2026	468500.00	3780560.00	-7.31E-08	0	0	-8.35E-09	0
2027	464900.00	3780660.00	-7.02E-09	0	0	-8.02E-10	0
2028	465000.00	3780660.00	-8.02E-09	0	2.24E-05	-9.16E-10	0
2029	465100.00	3780660.00	-9.20E-09	0	5.70E-05	-1.05E-09	0
2030	465200.00	3780660.00	-1.06E-08	0	6.97E-05	-1.21E-09	0
2031	465300.00	3780660.00	-1.23E-08	0	4.61E-05	-1.41E-09	0
2032	465400.00	3780660.00	-1.44E-08	0	0	-1.64E-09	0
2033	465500.00	3780660.00	-1.68E-08	0	0	-1.92E-09	0
2034	465600.00	3780660.00	-1.99E-08	0	0	-2.27E-09	0
2035	467800.00	3780660.00	-2.60E-07	0	0	-2.97E-08	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2036	467900.00	3780660.00	-2.23E-07	0	1.71E-05	-2.55E-08	0
2037	468000.00	3780660.00	-1.89E-07	0	4.45E-05	-2.16E-08	0
2038	468100.00	3780660.00	-1.59E-07	0	0	-1.82E-08	0
2039	468200.00	3780660.00	-1.34E-07	0	0	-1.53E-08	0
2040	468300.00	3780660.00	-1.13E-07	0	6.13E-05	-1.29E-08	0
2041	468400.00	3780660.00	-9.60E-08	0	0	-1.10E-08	0
2042	468500.00	3780660.00	-8.22E-08	0	1.00E-04	-9.39E-09	0
2043	464900.00	3780760.00	-6.54E-09	0	0	-7.47E-10	0
2044	465000.00	3780760.00	-7.47E-09	0	0	-8.53E-10	0
2045	465100.00	3780760.00	-8.57E-09	0	0	-9.79E-10	0
2046	465200.00	3780760.00	-9.89E-09	0	1.13E-05	-1.13E-09	0
2047	465300.00	3780760.00	-1.15E-08	0	6.12E-05	-1.32E-09	0
2048	465400.00	3780760.00	-1.35E-08	0	8.83E-05	-1.54E-09	0
2049	465500.00	3780760.00	-1.59E-08	0	7.50E-05	-1.82E-09	0
2050	465600.00	3780760.00	-1.89E-08	0	0	-2.16E-09	0
2051	467800.00	3780760.00	-3.33E-07	0	0	-3.80E-08	0
2052	467900.00	3780760.00	-2.78E-07	0	2.95E-04	-3.17E-08	0
2053	468000.00	3780760.00	-2.29E-07	0	0	-2.62E-08	0
2054	468100.00	3780760.00	-1.88E-07	0	0	-2.15E-08	0
2055	468200.00	3780760.00	-1.56E-07	0	5.81E-05	-1.78E-08	0
2056	468300.00	3780760.00	-1.30E-07	0	4.28E-05	-1.48E-08	0
2057	468400.00	3780760.00	-1.10E-07	0	5.41E-05	-1.25E-08	0
2058	468500.00	3780760.00	-9.36E-08	0	0	-1.07E-08	0
2059	464900.00	3780860.00	-5.67E-09	0	1.90E-05	-6.47E-10	0
2060	465000.00	3780860.00	-6.57E-09	0	1.15E-05	-7.51E-10	0
2061	465100.00	3780860.00	-7.59E-09	0	8.46E-07	-8.66E-10	0
2062	465200.00	3780860.00	-8.82E-09	0	0	-1.01E-09	0
2063	465300.00	3780860.00	-1.03E-08	0	0	-1.18E-09	0
2064	465400.00	3780860.00	-1.23E-08	0	0	-1.40E-09	0
2065	465500.00	3780860.00	-1.47E-08	0	6.20E-05	-1.68E-09	0
2066	465600.00	3780860.00	-1.75E-08	0	1.10E-04	-2.00E-09	0
2067	467800.00	3780860.00	-4.34E-07	0	4.05E-05	-4.96E-08	0
2068	467900.00	3780860.00	-3.49E-07	0	0	-3.99E-08	0
2069	468000.00	3780860.00	-2.80E-07	0	0	-3.20E-08	0
2070	468100.00	3780860.00	-2.25E-07	0	6.71E-05	-2.57E-08	0
2071	468200.00	3780860.00	-1.84E-07	0	7.74E-05	-2.10E-08	0
2072	468300.00	3780860.00	-1.52E-07	0	0	-1.73E-08	0
2073	468400.00	3780860.00	-1.27E-07	0	0	-1.45E-08	0
2074	468500.00	3780860.00	-1.07E-07	0	0	-1.22E-08	0
2075	464900.00	3780960.00	-3.49E-09	0	0	-3.99E-10	0
2076	465000.00	3780960.00	-5.79E-09	0	3.21E-05	-6.61E-10	0
2077	465100.00	3780960.00	-6.67E-09	0	3.90E-05	-7.62E-10	0
2078	465200.00	3780960.00	-7.79E-09	0	3.33E-05	-8.90E-10	0
2079	465300.00	3780960.00	-9.06E-09	0	2.19E-05	-1.03E-09	0
2080	465400.00	3780960.00	-1.07E-08	0	4.87E-06	-1.22E-09	0
2081	465500.00	3780960.00	-1.31E-08	0	0	-1.49E-09	0
2082	465600.00	3780960.00	-1.54E-08	0	0	-1.76E-09	0
2083	467800.00	3780960.00	-5.76E-07	0	0	-6.58E-08	0
2084	467900.00	3780960.00	-4.45E-07	0	0	-5.08E-08	0
2085	468000.00	3780960.00	-3.46E-07	0	1.04E-04	-3.95E-08	0
2086	468100.00	3780960.00	-2.73E-07	0	0	-3.12E-08	0
2087	468200.00	3780960.00	-2.19E-07	0	0	-2.50E-08	0
2088	468300.00	3780960.00	-1.78E-07	0	0	-2.03E-08	0
2089	468400.00	3780960.00	-1.46E-07	0	0	-1.66E-08	0
2090	468500.00	3780960.00	-1.20E-07	0	0	-1.37E-08	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2091	464900.00	3781060.00	2.28E-09	4.92E-05	0	2.32E-10	1.77E-05
2092	465000.00	3781060.00	8.79E-10	1.90E-05	0	8.96E-11	6.84E-06
2093	465100.00	3781060.00	-9.17E-10	0	0	-1.05E-10	0
2094	465200.00	3781060.00	-7.64E-10	0	0	-8.73E-11	0
2095	465300.00	3781060.00	-3.06E-09	0	0	-3.49E-10	0
2096	465400.00	3781060.00	-7.06E-09	0	0	-8.07E-10	0
2097	465500.00	3781060.00	-1.13E-08	0	5.30E-05	-1.29E-09	0
2098	465600.00	3781060.00	-1.06E-08	0	0	-1.21E-09	0
2099	467800.00	3781060.00	-7.80E-07	0	0	-8.91E-08	0
2100	467900.00	3781060.00	-5.77E-07	0	2.11E-04	-6.59E-08	0
2101	468000.00	3781060.00	-4.36E-07	0	0	-4.97E-08	0
2102	468100.00	3781060.00	-3.35E-07	0	0	-3.83E-08	0
2103	468200.00	3781060.00	-2.62E-07	0	0	-2.99E-08	0
2104	468300.00	3781060.00	-2.07E-07	0	0	-2.36E-08	0
2105	468400.00	3781060.00	-1.64E-07	0	0	-1.88E-08	0
2106	468500.00	3781060.00	-1.32E-07	0	0	-1.51E-08	0
2107	464900.00	3781160.00	2.27E-09	4.89E-05	0	2.31E-10	1.76E-05
2108	465000.00	3781160.00	2.23E-09	4.81E-05	0	2.27E-10	1.74E-05
2109	465100.00	3781160.00	1.87E-09	4.04E-05	0	1.91E-10	1.46E-05
2110	465200.00	3781160.00	1.77E-09	3.82E-05	0	1.80E-10	1.38E-05
2111	465300.00	3781160.00	1.07E-09	2.31E-05	0	1.09E-10	8.33E-06
2112	465400.00	3781160.00	7.39E-10	1.59E-05	0	7.53E-11	5.75E-06
2113	465500.00	3781160.00	-1.87E-09	0	0	-2.13E-10	0
2114	465600.00	3781160.00	-5.13E-10	0	0	-5.86E-11	0
2115	467800.00	3781160.00	-1.08E-06	0	3.25E-04	-1.23E-07	0
2116	467900.00	3781160.00	-7.62E-07	0	0	-8.70E-08	0
2117	468000.00	3781160.00	-5.51E-07	0	0	-6.29E-08	0
2118	468100.00	3781160.00	-4.06E-07	0	0	-4.64E-08	0
2119	468200.00	3781160.00	-3.04E-07	0	0	-3.47E-08	0
2120	468300.00	3781160.00	-2.31E-07	0	0	-2.63E-08	0
2121	468400.00	3781160.00	-1.77E-07	0	0	-2.02E-08	0
2122	468500.00	3781160.00	-1.38E-07	0	0	-1.58E-08	0
2123	464900.00	3781260.00	-8.73E-11	0	0	-9.97E-12	0
2124	465000.00	3781260.00	1.11E-09	2.39E-05	0	1.13E-10	8.63E-06
2125	465100.00	3781260.00	8.15E-10	1.76E-05	0	8.31E-11	6.35E-06
2126	465200.00	3781260.00	1.18E-09	2.55E-05	0	1.21E-10	9.22E-06
2127	465300.00	3781260.00	1.90E-09	4.09E-05	0	1.93E-10	1.48E-05
2128	465400.00	3781260.00	1.75E-09	3.76E-05	0	1.78E-10	1.36E-05
2129	465500.00	3781260.00	1.36E-09	2.94E-05	0	1.39E-10	1.06E-05
2130	465600.00	3781260.00	9.05E-10	1.95E-05	0	9.22E-11	7.04E-06
2131	467800.00	3781260.00	-1.51E-06	0	0	-1.73E-07	0
2132	467900.00	3781260.00	-9.86E-07	0	0	-1.13E-07	0
2133	468000.00	3781260.00	-6.63E-07	0	0	-7.57E-08	0
2134	468100.00	3781260.00	-4.58E-07	0	0	-5.23E-08	0
2135	468200.00	3781260.00	-3.24E-07	0	0	-3.70E-08	0
2136	468300.00	3781260.00	-2.35E-07	0	0	-2.68E-08	0
2137	468400.00	3781260.00	-1.73E-07	0	0	-1.98E-08	0
2138	468500.00	3781260.00	-1.30E-07	0	0	-1.49E-08	0
2139	464900.00	3781360.00	-1.56E-08	0	0	-1.78E-09	0
2140	465000.00	3781360.00	-8.11E-09	0	0	-9.26E-10	0
2141	465100.00	3781360.00	-1.22E-08	0	0	-1.39E-09	0
2142	465200.00	3781360.00	-5.08E-09	0	0	-5.80E-10	0
2143	465300.00	3781360.00	-6.21E-09	0	0	-7.09E-10	0
2144	465400.00	3781360.00	-1.72E-09	0	0	-1.97E-10	0
2145	465500.00	3781360.00	-2.41E-09	0	0	-2.76E-10	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2146	465600.00	3781360.00	-2.99E-09	0	0	-3.42E-10	0
2147	467800.00	3781360.00	-1.88E-06	0	0	-2.15E-07	0
2148	467900.00	3781360.00	-1.08E-06	0	0	-1.23E-07	0
2149	468000.00	3781360.00	-6.55E-07	0	0	-7.49E-08	0
2150	468100.00	3781360.00	-4.17E-07	0	0	-4.77E-08	0
2151	468200.00	3781360.00	-2.76E-07	0	0	-3.16E-08	0
2152	468300.00	3781360.00	-1.89E-07	0	0	-2.16E-08	0
2153	468400.00	3781360.00	-1.33E-07	0	0	-1.52E-08	0
2154	468500.00	3781360.00	-9.59E-08	0	0	-1.10E-08	0
2155	464900.00	3781460.00	-3.49E-08	0	0	-3.99E-09	0
2156	465000.00	3781460.00	-3.38E-08	0	0	-3.86E-09	0
2157	465100.00	3781460.00	-3.75E-08	0	0	-4.28E-09	0
2158	465200.00	3781460.00	-3.84E-08	0	0	-4.38E-09	0
2159	465300.00	3781460.00	-3.91E-08	0	0	-4.46E-09	0
2160	465400.00	3781460.00	-2.94E-08	0	0	-3.35E-09	0
2161	465500.00	3781460.00	-3.80E-08	0	0	-4.34E-09	0
2162	465600.00	3781460.00	-3.80E-08	0	0	-4.34E-09	0
2163	467800.00	3781460.00	-1.26E-06	0	0	-1.44E-07	0
2164	467900.00	3781460.00	-6.15E-07	0	0	-7.02E-08	0
2165	468000.00	3781460.00	-3.25E-07	0	0	-3.71E-08	0
2166	468100.00	3781460.00	-1.85E-07	0	0	-2.12E-08	0
2167	468200.00	3781460.00	-1.10E-07	0	0	-1.26E-08	0
2168	468300.00	3781460.00	-6.72E-08	0	0	-7.67E-09	0
2169	468400.00	3781460.00	-4.21E-08	0	0	-4.80E-09	0
2170	468500.00	3781460.00	-2.68E-08	0	0	-3.06E-09	0
2171	464900.00	3781560.00	-5.74E-08	0	0	-6.55E-09	0
2172	465000.00	3781560.00	-6.34E-08	0	0	-7.24E-09	0
2173	465100.00	3781560.00	-7.10E-08	0	0	-8.11E-09	0
2174	465200.00	3781560.00	-7.68E-08	0	0	-8.78E-09	0
2175	465300.00	3781560.00	-8.37E-08	0	0	-9.56E-09	0
2176	465400.00	3781560.00	-8.98E-08	0	0	-1.03E-08	0
2177	465500.00	3781560.00	-1.05E-07	0	0	-1.20E-08	0
2178	465600.00	3781560.00	-1.14E-07	0	0	-1.30E-08	0
2179	467800.00	3781560.00	8.02E-07	1.73E-02	0	8.18E-08	6.24E-03
2180	467900.00	3781560.00	4.89E-07	1.06E-02	9.80E-06	4.99E-08	3.81E-03
2181	468000.00	3781560.00	3.19E-07	6.89E-03	4.29E-06	3.26E-08	2.49E-03
2182	468100.00	3781560.00	2.20E-07	4.75E-03	6.69E-05	2.25E-08	1.72E-03
2183	468200.00	3781560.00	1.57E-07	3.39E-03	1.08E-04	1.60E-08	1.22E-03
2184	468300.00	3781560.00	1.17E-07	2.53E-03	1.16E-04	1.19E-08	9.12E-04
2185	468400.00	3781560.00	8.99E-08	1.94E-03	9.62E-05	9.17E-09	7.00E-04
2186	468500.00	3781560.00	7.05E-08	1.52E-03	7.93E-05	7.18E-09	5.49E-04
2187	464900.00	3781660.00	-9.05E-08	0	0	-1.03E-08	0
2188	465000.00	3781660.00	-1.01E-07	0	0	-1.15E-08	0
2189	465100.00	3781660.00	-1.13E-07	0	0	-1.30E-08	0
2190	465200.00	3781660.00	-1.25E-07	0	0	-1.43E-08	0
2191	465300.00	3781660.00	-1.41E-07	0	0	-1.61E-08	0
2192	465400.00	3781660.00	-1.53E-07	0	0	-1.74E-08	0
2193	465500.00	3781660.00	-1.77E-07	0	0	-2.02E-08	0
2194	465600.00	3781660.00	-1.91E-07	0	0	-2.18E-08	0
2195	467800.00	3781660.00	2.20E-06	4.75E-02	3.36E-04	2.25E-07	1.72E-02
2196	467900.00	3781660.00	1.26E-06	2.72E-02	0	1.29E-07	9.82E-03
2197	468000.00	3781660.00	7.85E-07	1.69E-02	4.12E-04	8.00E-08	6.11E-03
2198	468100.00	3781660.00	5.20E-07	1.12E-02	5.48E-04	5.30E-08	4.04E-03
2199	468200.00	3781660.00	3.61E-07	7.78E-03	4.11E-04	3.68E-08	2.81E-03
2200	468300.00	3781660.00	2.59E-07	5.59E-03	3.54E-04	2.64E-08	2.02E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2201	468400.00	3781660.00	1.94E-07	4.18E-03	2.78E-04	1.97E-08	1.51E-03
2202	468500.00	3781660.00	1.48E-07	3.18E-03	2.00E-04	1.50E-08	1.15E-03
2203	464900.00	3781760.00	-1.22E-07	0	2.69E-05	-1.39E-08	0
2204	465000.00	3781760.00	-1.37E-07	0	0	-1.56E-08	0
2205	465100.00	3781760.00	-1.52E-07	0	0	-1.73E-08	0
2206	465200.00	3781760.00	-1.69E-07	0	0	-1.93E-08	0
2207	465300.00	3781760.00	-1.82E-07	0	0	-2.08E-08	0
2208	465400.00	3781760.00	-2.03E-07	0	0	-2.32E-08	0
2209	465500.00	3781760.00	-2.30E-07	0	0	-2.62E-08	0
2210	465600.00	3781760.00	-2.50E-07	0	0	-2.86E-08	0
2211	467800.00	3781760.00	1.91E-06	4.11E-02	1.88E-03	1.94E-07	1.48E-02
2212	467900.00	3781760.00	1.19E-06	2.56E-02	8.58E-04	1.21E-07	9.26E-03
2213	468000.00	3781760.00	7.88E-07	1.70E-02	0	8.04E-08	6.14E-03
2214	468100.00	3781760.00	5.45E-07	1.17E-02	0	5.55E-08	4.24E-03
2215	468200.00	3781760.00	3.93E-07	8.48E-03	0	4.01E-08	3.06E-03
2216	468300.00	3781760.00	2.93E-07	6.31E-03	2.74E-06	2.98E-08	2.28E-03
2217	468400.00	3781760.00	2.23E-07	4.81E-03	6.93E-05	2.28E-08	1.74E-03
2218	468500.00	3781760.00	1.74E-07	3.75E-03	2.57E-05	1.77E-08	1.35E-03
2219	464900.00	3781860.00	-1.40E-07	0	0	-1.60E-08	0
2220	465000.00	3781860.00	-1.54E-07	0	0	-1.76E-08	0
2221	465100.00	3781860.00	-1.69E-07	0	0	-1.93E-08	0
2222	465200.00	3781860.00	-1.81E-07	0	0	-2.07E-08	0
2223	465300.00	3781860.00	-1.96E-07	0	0	-2.23E-08	0
2224	465400.00	3781860.00	-2.12E-07	0	0	-2.42E-08	0
2225	465500.00	3781860.00	-2.27E-07	0	0	-2.59E-08	0
2226	465600.00	3781860.00	-2.43E-07	0	0	-2.77E-08	0
2227	467800.00	3781860.00	1.38E-06	2.97E-02	6.91E-04	1.40E-07	1.07E-02
2228	467900.00	3781860.00	9.23E-07	1.99E-02	1.29E-03	9.40E-08	7.18E-03
2229	468000.00	3781860.00	6.14E-07	1.32E-02	1.46E-03	6.26E-08	4.78E-03
2230	468100.00	3781860.00	4.49E-07	9.67E-03	7.26E-04	4.57E-08	3.49E-03
2231	468200.00	3781860.00	3.35E-07	7.23E-03	1.08E-04	3.42E-08	2.61E-03
2232	468300.00	3781860.00	2.58E-07	5.56E-03	0	2.63E-08	2.01E-03
2233	468400.00	3781860.00	2.02E-07	4.36E-03	0	2.06E-08	1.57E-03
2234	468500.00	3781860.00	1.62E-07	3.49E-03	0	1.65E-08	1.26E-03
2235	464900.00	3781960.00	-1.33E-07	0	0	-1.51E-08	0
2236	465000.00	3781960.00	-1.41E-07	0	0	-1.61E-08	0
2237	465100.00	3781960.00	-1.47E-07	0	0	-1.68E-08	0
2238	465200.00	3781960.00	-1.52E-07	0	0	-1.74E-08	0
2239	465300.00	3781960.00	-1.55E-07	0	0	-1.77E-08	0
2240	465400.00	3781960.00	-1.56E-07	0	0	-1.78E-08	0
2241	465500.00	3781960.00	-1.52E-07	0	0	-1.74E-08	0
2242	465600.00	3781960.00	-1.42E-07	0	0	-1.62E-08	0
2243	467800.00	3781960.00	1.09E-06	2.35E-02	0	1.11E-07	8.49E-03
2244	467900.00	3781960.00	7.42E-07	1.60E-02	0	7.56E-08	5.78E-03
2245	468000.00	3781960.00	5.11E-07	1.10E-02	0	5.21E-08	3.98E-03
2246	468100.00	3781960.00	3.59E-07	7.74E-03	8.23E-04	3.66E-08	2.79E-03
2247	468200.00	3781960.00	2.74E-07	5.91E-03	9.28E-04	2.79E-08	2.13E-03
2248	468300.00	3781960.00	2.15E-07	4.63E-03	6.13E-04	2.19E-08	1.67E-03
2249	468400.00	3781960.00	1.71E-07	3.69E-03	2.42E-04	1.74E-08	1.33E-03
2250	468500.00	3781960.00	1.38E-07	2.98E-03	0	1.41E-08	1.08E-03
2251	464900.00	3782060.00	-9.78E-08	0	0	-1.12E-08	0
2252	465000.00	3782060.00	-9.53E-08	0	1.31E-05	-1.09E-08	0
2253	465100.00	3782060.00	-9.14E-08	0	0	-1.04E-08	0
2254	465200.00	3782060.00	-8.30E-08	0	0	-9.48E-09	0
2255	465300.00	3782060.00	-7.10E-08	0	0	-8.11E-09	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2256	465400.00	3782060.00	-5.21E-08	0	0	-5.96E-09	0
2257	465500.00	3782060.00	-2.44E-08	0	0	-2.79E-09	0
2258	465600.00	3782060.00	6.47E-09	1.40E-04	0	6.60E-10	5.04E-05
2259	467800.00	3782060.00	8.23E-07	1.78E-02	7.99E-04	8.39E-08	6.41E-03
2260	467900.00	3782060.00	6.01E-07	1.29E-02	0	6.12E-08	4.67E-03
2261	468000.00	3782060.00	4.48E-07	9.65E-03	0	4.56E-08	3.48E-03
2262	468100.00	3782060.00	3.29E-07	7.08E-03	0	3.35E-08	2.56E-03
2263	468200.00	3782060.00	2.40E-07	5.18E-03	0	2.45E-08	1.87E-03
2264	468300.00	3782060.00	1.79E-07	3.87E-03	3.91E-04	1.83E-08	1.40E-03
2265	468400.00	3782060.00	1.46E-07	3.15E-03	4.86E-04	1.49E-08	1.14E-03
2266	468500.00	3782060.00	1.19E-07	2.57E-03	4.37E-04	1.22E-08	9.28E-04
2267	464900.00	3782160.00	-4.15E-08	0	0	-4.75E-09	0
2268	465000.00	3782160.00	-2.95E-08	0	2.88E-05	-3.37E-09	0
2269	465100.00	3782160.00	-1.43E-08	0	0	-1.63E-09	0
2270	465200.00	3782160.00	7.71E-09	1.66E-04	7.21E-06	7.86E-10	6.00E-05
2271	465300.00	3782160.00	3.87E-08	8.34E-04	0	3.94E-09	3.01E-04
2272	465400.00	3782160.00	7.52E-08	1.62E-03	0	7.66E-09	5.85E-04
2273	465500.00	3782160.00	1.19E-07	2.57E-03	0	1.21E-08	9.27E-04
2274	465600.00	3782160.00	1.63E-07	3.52E-03	0	1.66E-08	1.27E-03
2275	467800.00	3782160.00	6.27E-07	1.35E-02	0	6.39E-08	4.88E-03
2276	467900.00	3782160.00	4.86E-07	1.05E-02	2.22E-04	4.95E-08	3.78E-03
2277	468000.00	3782160.00	3.75E-07	8.08E-03	0	3.82E-08	2.92E-03
2278	468100.00	3782160.00	2.90E-07	6.25E-03	0	2.96E-08	2.26E-03
2279	468200.00	3782160.00	2.25E-07	4.86E-03	0	2.30E-08	1.75E-03
2280	468300.00	3782160.00	1.66E-07	3.57E-03	0	1.69E-08	1.29E-03
2281	468400.00	3782160.00	1.27E-07	2.73E-03	5.00E-05	1.29E-08	9.87E-04
2282	468500.00	3782160.00	1.05E-07	2.27E-03	1.38E-04	1.07E-08	8.19E-04
2283	464900.00	3782260.00	2.60E-08	5.61E-04	0	2.65E-09	2.02E-04
2284	465000.00	3782260.00	4.60E-08	9.92E-04	0	4.69E-09	3.58E-04
2285	465100.00	3782260.00	7.39E-08	1.59E-03	0	7.53E-09	5.75E-04
2286	465200.00	3782260.00	1.07E-07	2.32E-03	0	1.10E-08	8.36E-04
2287	465300.00	3782260.00	1.46E-07	3.15E-03	0	1.49E-08	1.14E-03
2288	465400.00	3782260.00	1.82E-07	3.93E-03	0	1.86E-08	1.42E-03
2289	465500.00	3782260.00	2.28E-07	4.92E-03	0	2.33E-08	1.78E-03
2290	465600.00	3782260.00	2.75E-07	5.92E-03	1.08E-04	2.80E-08	2.14E-03
2291	467800.00	3782260.00	5.16E-07	1.11E-02	7.11E-05	5.26E-08	4.02E-03
2292	467900.00	3782260.00	4.18E-07	9.02E-03	1.82E-05	4.26E-08	3.25E-03
2293	468000.00	3782260.00	3.18E-07	6.86E-03	0	3.25E-08	2.48E-03
2294	468100.00	3782260.00	2.51E-07	5.42E-03	2.94E-04	2.56E-08	1.96E-03
2295	468200.00	3782260.00	2.02E-07	4.36E-03	1.22E-04	2.06E-08	1.57E-03
2296	468300.00	3782260.00	1.66E-07	3.58E-03	0	1.69E-08	1.29E-03
2297	468400.00	3782260.00	1.24E-07	2.67E-03	0	1.26E-08	9.64E-04
2298	468500.00	3782260.00	9.50E-08	2.05E-03	0	9.69E-09	7.40E-04
2299	464900.00	3782360.00	8.82E-08	1.90E-03	0	8.99E-09	6.87E-04
2300	465000.00	3782360.00	1.13E-07	2.44E-03	0	1.15E-08	8.81E-04
2301	465100.00	3782360.00	1.43E-07	3.07E-03	0	1.45E-08	1.11E-03
2302	465200.00	3782360.00	1.77E-07	3.82E-03	0	1.81E-08	1.38E-03
2303	465300.00	3782360.00	2.06E-07	4.44E-03	3.37E-05	2.10E-08	1.60E-03
2304	465400.00	3782360.00	2.35E-07	5.08E-03	7.69E-05	2.40E-08	1.83E-03
2305	465500.00	3782360.00	2.66E-07	5.74E-03	3.16E-04	2.71E-08	2.07E-03
2306	465600.00	3782360.00	2.97E-07	6.40E-03	1.12E-04	3.03E-08	2.31E-03
2307	467800.00	3782360.00	4.14E-07	8.92E-03	3.44E-04	4.22E-08	3.22E-03
2308	467900.00	3782360.00	3.36E-07	7.23E-03	0	3.42E-08	2.61E-03
2309	468000.00	3782360.00	2.57E-07	5.55E-03	0	2.62E-08	2.00E-03
2310	468100.00	3782360.00	2.18E-07	4.69E-03	0	2.22E-08	1.69E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2311	468200.00	3782360.00	1.79E-07	3.86E-03	2.58E-04	1.83E-08	1.39E-03
2312	468300.00	3782360.00	1.48E-07	3.20E-03	8.25E-05	1.51E-08	1.16E-03
2313	468400.00	3782360.00	1.18E-07	2.54E-03	0	1.20E-08	9.17E-04
2314	468500.00	3782360.00	8.71E-08	1.88E-03	0	8.87E-09	6.78E-04
2315	464900.00	3782460.00	1.32E-07	2.84E-03	1.26E-05	1.34E-08	1.02E-03
2316	465000.00	3782460.00	1.56E-07	3.35E-03	4.94E-05	1.58E-08	1.21E-03
2317	465100.00	3782460.00	1.79E-07	3.85E-03	7.02E-05	1.82E-08	1.39E-03
2318	465200.00	3782460.00	2.02E-07	4.36E-03	8.19E-05	2.06E-08	1.57E-03
2319	465300.00	3782460.00	2.19E-07	4.72E-03	2.71E-04	2.23E-08	1.70E-03
2320	465400.00	3782460.00	2.37E-07	5.11E-03	1.85E-04	2.41E-08	1.84E-03
2321	465500.00	3782460.00	2.54E-07	5.47E-03	0	2.59E-08	1.97E-03
2322	465600.00	3782460.00	2.65E-07	5.72E-03	0	2.71E-08	2.07E-03
2323	467800.00	3782460.00	2.84E-07	6.13E-03	3.07E-04	2.90E-08	2.21E-03
2324	467900.00	3782460.00	2.79E-07	6.02E-03	4.66E-06	2.85E-08	2.17E-03
2325	468000.00	3782460.00	2.26E-07	4.88E-03	0	2.31E-08	1.76E-03
2326	468100.00	3782460.00	1.81E-07	3.91E-03	0	1.85E-08	1.41E-03
2327	468200.00	3782460.00	1.57E-07	3.39E-03	0	1.60E-08	1.22E-03
2328	468300.00	3782460.00	1.33E-07	2.88E-03	1.49E-04	1.36E-08	1.04E-03
2329	468400.00	3782460.00	1.14E-07	2.47E-03	0	1.17E-08	8.90E-04
2330	468500.00	3782460.00	8.95E-08	1.93E-03	0	9.12E-09	6.96E-04
2331	464900.00	3782560.00	1.45E-07	3.13E-03	4.58E-06	1.48E-08	1.13E-03
2332	465000.00	3782560.00	1.62E-07	3.49E-03	8.48E-05	1.65E-08	1.26E-03
2333	465100.00	3782560.00	1.76E-07	3.79E-03	2.41E-04	1.79E-08	1.37E-03
2334	465200.00	3782560.00	1.90E-07	4.09E-03	2.22E-04	1.93E-08	1.48E-03
2335	465300.00	3782560.00	2.01E-07	4.34E-03	2.73E-06	2.05E-08	1.57E-03
2336	465400.00	3782560.00	2.09E-07	4.51E-03	0	2.13E-08	1.63E-03
2337	465500.00	3782560.00	2.15E-07	4.63E-03	0	2.19E-08	1.67E-03
2338	465600.00	3782560.00	2.15E-07	4.64E-03	2.12E-04	2.19E-08	1.67E-03
2339	467800.00	3782560.00	2.49E-07	5.36E-03	2.99E-04	2.53E-08	1.93E-03
2340	467900.00	3782560.00	2.18E-07	4.69E-03	1.27E-04	2.22E-08	1.69E-03
2341	468000.00	3782560.00	2.12E-07	4.58E-03	0	2.16E-08	1.65E-03
2342	468100.00	3782560.00	1.79E-07	3.85E-03	0	1.82E-08	1.39E-03
2343	468200.00	3782560.00	1.36E-07	2.93E-03	0	1.38E-08	1.06E-03
2344	468300.00	3782560.00	1.20E-07	2.58E-03	0	1.22E-08	9.32E-04
2345	468400.00	3782560.00	1.03E-07	2.21E-03	1.53E-04	1.05E-08	7.98E-04
2346	468500.00	3782560.00	8.79E-08	1.90E-03	1.85E-04	8.96E-09	6.84E-04
2347	464900.00	3782660.00	1.47E-07	3.17E-03	3.04E-04	1.50E-08	1.14E-03
2348	465000.00	3782660.00	1.56E-07	3.36E-03	2.25E-04	1.59E-08	1.21E-03
2349	465100.00	3782660.00	1.59E-07	3.43E-03	4.90E-05	1.62E-08	1.24E-03
2350	465200.00	3782660.00	1.64E-07	3.53E-03	0	1.67E-08	1.27E-03
2351	465300.00	3782660.00	1.68E-07	3.63E-03	0	1.72E-08	1.31E-03
2352	465400.00	3782660.00	1.71E-07	3.69E-03	3.64E-04	1.75E-08	1.33E-03
2353	465500.00	3782660.00	1.69E-07	3.64E-03	4.77E-06	1.72E-08	1.31E-03
2354	465600.00	3782660.00	1.60E-07	3.44E-03	0	1.63E-08	1.24E-03
2355	467800.00	3782660.00	1.89E-07	4.08E-03	3.91E-04	1.93E-08	1.47E-03
2356	467900.00	3782660.00	1.81E-07	3.89E-03	0	1.84E-08	1.41E-03
2357	468000.00	3782660.00	1.73E-07	3.72E-03	1.06E-04	1.76E-08	1.34E-03
2358	468100.00	3782660.00	1.59E-07	3.43E-03	0	1.62E-08	1.24E-03
2359	468200.00	3782660.00	1.35E-07	2.90E-03	0	1.37E-08	1.05E-03
2360	468300.00	3782660.00	9.71E-08	2.09E-03	6.30E-05	9.90E-09	7.56E-04
2361	468400.00	3782660.00	7.06E-08	1.52E-03	2.64E-04	7.19E-09	5.49E-04
2362	468500.00	3782660.00	7.16E-08	1.54E-03	8.85E-06	7.30E-09	5.57E-04
2363	464900.00	3782760.00	1.36E-07	2.93E-03	7.43E-05	1.38E-08	1.06E-03
2364	465000.00	3782760.00	1.40E-07	3.01E-03	0	1.42E-08	1.09E-03
2365	465100.00	3782760.00	1.42E-07	3.06E-03	0	1.45E-08	1.11E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2366	465200.00	3782760.00	1.42E-07	3.05E-03	2.30E-04	1.44E-08	1.10E-03
2367	465300.00	3782760.00	1.37E-07	2.95E-03	1.25E-04	1.39E-08	1.07E-03
2368	465400.00	3782760.00	1.31E-07	2.82E-03	0	1.33E-08	1.02E-03
2369	465500.00	3782760.00	1.20E-07	2.60E-03	0	1.23E-08	9.37E-04
2370	465600.00	3782760.00	1.05E-07	2.27E-03	2.64E-04	1.07E-08	8.20E-04
2371	465700.00	3782760.00	8.90E-08	1.92E-03	1.93E-04	9.07E-09	6.92E-04
2372	465800.00	3782760.00	7.14E-08	1.54E-03	4.90E-05	7.28E-09	5.56E-04
2373	465900.00	3782760.00	6.07E-08	1.31E-03	0	6.19E-09	4.72E-04
2374	466000.00	3782760.00	5.80E-08	1.25E-03	3.82E-05	5.91E-09	4.51E-04
2375	466100.00	3782760.00	6.16E-08	1.33E-03	3.65E-04	6.28E-09	4.79E-04
2376	466200.00	3782760.00	6.59E-08	1.42E-03	3.43E-04	6.72E-09	5.13E-04
2377	466300.00	3782760.00	6.82E-08	1.47E-03	0	6.95E-09	5.31E-04
2378	466400.00	3782760.00	7.13E-08	1.54E-03	3.55E-04	7.27E-09	5.55E-04
2379	466500.00	3782760.00	8.11E-08	1.75E-03	4.67E-05	8.26E-09	6.31E-04
2380	466600.00	3782760.00	9.51E-08	2.05E-03	2.80E-04	9.70E-09	7.40E-04
2381	466700.00	3782760.00	1.04E-07	2.25E-03	4.15E-04	1.06E-08	8.11E-04
2382	466800.00	3782760.00	1.10E-07	2.37E-03	5.42E-04	1.12E-08	8.56E-04
2383	466900.00	3782760.00	1.18E-07	2.55E-03	6.70E-04	1.21E-08	9.21E-04
2384	467000.00	3782760.00	1.34E-07	2.90E-03	0	1.37E-08	1.05E-03
2385	467100.00	3782760.00	1.51E-07	3.25E-03	4.07E-04	1.54E-08	1.17E-03
2386	467200.00	3782760.00	1.48E-07	3.20E-03	8.35E-04	1.51E-08	1.16E-03
2387	467300.00	3782760.00	1.54E-07	3.32E-03	3.54E-04	1.57E-08	1.20E-03
2388	467400.00	3782760.00	1.57E-07	3.39E-03	4.81E-04	1.60E-08	1.22E-03
2389	467500.00	3782760.00	1.54E-07	3.33E-03	2.21E-04	1.57E-08	1.20E-03
2390	467600.00	3782760.00	1.55E-07	3.34E-03	1.40E-04	1.58E-08	1.21E-03
2391	467700.00	3782760.00	1.49E-07	3.22E-03	6.63E-04	1.52E-08	1.16E-03
2392	467800.00	3782760.00	1.44E-07	3.11E-03	1.84E-04	1.47E-08	1.12E-03
2393	467900.00	3782760.00	1.41E-07	3.05E-03	1.90E-04	1.44E-08	1.10E-03
2394	468000.00	3782760.00	1.40E-07	3.02E-03	3.01E-05	1.43E-08	1.09E-03
2395	468100.00	3782760.00	9.80E-08	2.11E-03	2.25E-04	9.98E-09	7.62E-04
2396	468200.00	3782760.00	8.68E-08	1.87E-03	3.59E-05	8.84E-09	6.75E-04
2397	468300.00	3782760.00	1.08E-07	2.33E-03	2.94E-05	1.10E-08	8.39E-04
2398	468400.00	3782760.00	9.88E-08	2.13E-03	0	1.01E-08	7.69E-04
2399	468500.00	3782760.00	7.23E-08	1.56E-03	0	7.37E-09	5.63E-04
2400	464900.00	3782860.00	1.20E-07	2.58E-03	0	1.22E-08	9.33E-04
2401	465000.00	3782860.00	1.21E-07	2.61E-03	1.19E-04	1.23E-08	9.42E-04
2402	465100.00	3782860.00	1.20E-07	2.58E-03	2.76E-04	1.22E-08	9.31E-04
2403	465200.00	3782860.00	1.15E-07	2.48E-03	2.63E-05	1.17E-08	8.94E-04
2404	465300.00	3782860.00	1.07E-07	2.30E-03	0	1.09E-08	8.30E-04
2405	465400.00	3782860.00	9.50E-08	2.05E-03	1.41E-04	9.68E-09	7.39E-04
2406	465500.00	3782860.00	8.05E-08	1.74E-03	3.35E-04	8.20E-09	6.26E-04
2407	465600.00	3782860.00	6.57E-08	1.42E-03	6.91E-05	6.69E-09	5.11E-04
2408	465700.00	3782860.00	5.44E-08	1.17E-03	0	5.54E-09	4.23E-04
2409	465800.00	3782860.00	4.67E-08	1.01E-03	1.65E-04	4.76E-09	3.63E-04
2410	465900.00	3782860.00	4.51E-08	9.71E-04	6.37E-05	4.59E-09	3.51E-04
2411	466000.00	3782860.00	5.01E-08	1.08E-03	2.84E-04	5.10E-09	3.90E-04
2412	466100.00	3782860.00	5.43E-08	1.17E-03	4.68E-04	5.54E-09	4.23E-04
2413	466200.00	3782860.00	5.49E-08	1.18E-03	0	5.59E-09	4.27E-04
2414	466300.00	3782860.00	5.31E-08	1.14E-03	5.05E-04	5.41E-09	4.13E-04
2415	466400.00	3782860.00	6.07E-08	1.31E-03	1.19E-04	6.18E-09	4.72E-04
2416	466500.00	3782860.00	7.41E-08	1.60E-03	6.90E-05	7.55E-09	5.77E-04
2417	466600.00	3782860.00	8.26E-08	1.78E-03	5.55E-04	8.41E-09	6.43E-04
2418	466700.00	3782860.00	8.53E-08	1.84E-03	2.90E-04	8.69E-09	6.64E-04
2419	466800.00	3782860.00	8.85E-08	1.91E-03	3.39E-04	9.02E-09	6.89E-04
2420	466900.00	3782860.00	8.58E-08	1.85E-03	1.18E-03	8.74E-09	6.68E-04

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2421	467000.00	3782860.00	9.06E-08	1.95E-03	9.46E-05	9.24E-09	7.05E-04
2422	467100.00	3782860.00	9.68E-08	2.09E-03	5.57E-04	9.86E-09	7.53E-04
2423	467200.00	3782860.00	1.27E-07	2.73E-03	2.07E-04	1.29E-08	9.85E-04
2424	467300.00	3782860.00	1.20E-07	2.59E-03	3.51E-04	1.22E-08	9.34E-04
2425	467400.00	3782860.00	1.24E-07	2.68E-03	4.25E-04	1.27E-08	9.68E-04
2426	467500.00	3782860.00	1.25E-07	2.69E-03	2.09E-04	1.27E-08	9.72E-04
2427	467600.00	3782860.00	1.19E-07	2.56E-03	3.00E-04	1.21E-08	9.25E-04
2428	467700.00	3782860.00	1.17E-07	2.52E-03	2.46E-05	1.19E-08	9.10E-04
2429	467800.00	3782860.00	1.16E-07	2.51E-03	1.07E-04	1.19E-08	9.05E-04
2430	467900.00	3782860.00	1.17E-07	2.51E-03	2.77E-04	1.19E-08	9.07E-04
2431	468000.00	3782860.00	1.06E-07	2.29E-03	0	1.08E-08	8.28E-04
2432	468100.00	3782860.00	9.17E-08	1.98E-03	1.98E-04	9.35E-09	7.14E-04
2433	468200.00	3782860.00	1.09E-07	2.34E-03	0	1.11E-08	8.45E-04
2434	468300.00	3782860.00	1.00E-07	2.16E-03	0	1.02E-08	7.80E-04
2435	468400.00	3782860.00	8.48E-08	1.83E-03	0	8.64E-09	6.60E-04
2436	468500.00	3782860.00	7.61E-08	1.64E-03	0	7.76E-09	5.92E-04
2437	464900.00	3782960.00	1.03E-07	2.22E-03	2.57E-04	1.05E-08	8.03E-04
2438	465000.00	3782960.00	1.01E-07	2.18E-03	1.37E-04	1.03E-08	7.86E-04
2439	465100.00	3782960.00	9.54E-08	2.06E-03	0	9.73E-09	7.43E-04
2440	465200.00	3782960.00	8.68E-08	1.87E-03	0	8.85E-09	6.76E-04
2441	465300.00	3782960.00	7.55E-08	1.63E-03	2.57E-04	7.69E-09	5.87E-04
2442	465400.00	3782960.00	6.30E-08	1.36E-03	1.71E-04	6.42E-09	4.90E-04
2443	465500.00	3782960.00	5.12E-08	1.10E-03	0	5.21E-09	3.98E-04
2444	465600.00	3782960.00	4.22E-08	9.10E-04	1.46E-05	4.30E-09	3.28E-04
2445	465700.00	3782960.00	3.76E-08	8.10E-04	1.88E-04	3.83E-09	2.93E-04
2446	465800.00	3782960.00	3.91E-08	8.42E-04	1.19E-04	3.98E-09	3.04E-04
2447	465900.00	3782960.00	4.40E-08	9.48E-04	1.77E-04	4.48E-09	3.42E-04
2448	466000.00	3782960.00	4.54E-08	9.79E-04	5.38E-04	4.63E-09	3.53E-04
2449	466100.00	3782960.00	4.53E-08	9.76E-04	0	4.62E-09	3.52E-04
2450	466200.00	3782960.00	4.44E-08	9.56E-04	5.24E-04	4.52E-09	3.45E-04
2451	466300.00	3782960.00	4.69E-08	1.01E-03	5.75E-05	4.78E-09	3.65E-04
2452	466400.00	3782960.00	5.81E-08	1.25E-03	1.88E-04	5.92E-09	4.52E-04
2453	466500.00	3782960.00	6.60E-08	1.42E-03	4.23E-04	6.73E-09	5.14E-04
2454	466600.00	3782960.00	6.93E-08	1.49E-03	1.32E-04	7.07E-09	5.40E-04
2455	466700.00	3782960.00	7.16E-08	1.54E-03	3.15E-04	7.29E-09	5.57E-04
2456	466800.00	3782960.00	7.05E-08	1.52E-03	2.18E-04	7.18E-09	5.48E-04
2457	466900.00	3782960.00	7.28E-08	1.57E-03	8.21E-04	7.42E-09	5.67E-04
2458	467000.00	3782960.00	7.75E-08	1.67E-03	6.00E-04	7.89E-09	6.03E-04
2459	467100.00	3782960.00	8.15E-08	1.76E-03	5.60E-04	8.31E-09	6.34E-04
2460	467200.00	3782960.00	8.94E-08	1.93E-03	2.71E-04	9.11E-09	6.96E-04
2461	467300.00	3782960.00	9.23E-08	1.99E-03	3.69E-04	9.40E-09	7.18E-04
2462	467400.00	3782960.00	9.56E-08	2.06E-03	4.30E-04	9.74E-09	7.44E-04
2463	467500.00	3782960.00	9.88E-08	2.13E-03	2.62E-04	1.01E-08	7.69E-04
2464	467600.00	3782960.00	9.62E-08	2.07E-03	2.80E-04	9.81E-09	7.49E-04
2465	467700.00	3782960.00	9.36E-08	2.02E-03	0	9.54E-09	7.28E-04
2466	467800.00	3782960.00	9.23E-08	1.99E-03	3.97E-04	9.41E-09	7.18E-04
2467	467900.00	3782960.00	6.72E-08	1.45E-03	1.02E-03	6.85E-09	5.23E-04
2468	468000.00	3782960.00	6.90E-08	1.49E-03	3.82E-04	7.03E-09	5.37E-04
2469	468100.00	3782960.00	8.89E-08	1.92E-03	6.91E-05	9.06E-09	6.92E-04
2470	468200.00	3782960.00	8.71E-08	1.88E-03	2.49E-05	8.87E-09	6.78E-04
2471	468300.00	3782960.00	8.29E-08	1.79E-03	0	8.45E-09	6.45E-04
2472	468400.00	3782960.00	7.85E-08	1.69E-03	0	8.00E-09	6.11E-04
2473	468500.00	3782960.00	7.22E-08	1.56E-03	0	7.36E-09	5.62E-04
2474	464900.00	3783060.00	8.43E-08	1.82E-03	0	8.60E-09	6.56E-04
2475	465000.00	3783060.00	7.83E-08	1.69E-03	0	7.98E-09	6.09E-04

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2476	465100.00	3783060.00	7.01E-08	1.51E-03	1.37E-04	7.15E-09	5.46E-04
2477	465200.00	3783060.00	6.00E-08	1.29E-03	2.63E-04	6.12E-09	4.67E-04
2478	465300.00	3783060.00	4.95E-08	1.07E-03	4.55E-05	5.05E-09	3.85E-04
2479	465400.00	3783060.00	4.01E-08	8.64E-04	7.79E-07	4.09E-09	3.12E-04
2480	465500.00	3783060.00	3.33E-08	7.17E-04	8.18E-05	3.39E-09	2.59E-04
2481	465600.00	3783060.00	3.09E-08	6.66E-04	1.66E-04	3.15E-09	2.40E-04
2482	465700.00	3783060.00	3.33E-08	7.17E-04	1.55E-04	3.39E-09	2.59E-04
2483	465800.00	3783060.00	3.77E-08	8.13E-04	8.10E-05	3.84E-09	2.93E-04
2484	465900.00	3783060.00	4.00E-08	8.63E-04	6.19E-04	4.08E-09	3.12E-04
2485	466000.00	3783060.00	3.90E-08	8.41E-04	5.94E-05	3.97E-09	3.04E-04
2486	466100.00	3783060.00	3.64E-08	7.85E-04	3.89E-04	3.71E-09	2.83E-04
2487	466200.00	3783060.00	3.79E-08	8.17E-04	1.11E-04	3.86E-09	2.95E-04
2488	466300.00	3783060.00	4.50E-08	9.70E-04	2.10E-04	4.59E-09	3.50E-04
2489	466400.00	3783060.00	5.34E-08	1.15E-03	0	5.44E-09	4.16E-04
2490	466500.00	3783060.00	5.75E-08	1.24E-03	3.79E-04	5.86E-09	4.47E-04
2491	466600.00	3783060.00	5.79E-08	1.25E-03	3.01E-04	5.90E-09	4.51E-04
2492	466700.00	3783060.00	5.86E-08	1.26E-03	3.83E-04	5.97E-09	4.56E-04
2493	466800.00	3783060.00	5.98E-08	1.29E-03	6.56E-04	6.10E-09	4.66E-04
2494	466900.00	3783060.00	6.26E-08	1.35E-03	1.54E-04	6.38E-09	4.88E-04
2495	467000.00	3783060.00	6.69E-08	1.44E-03	3.21E-04	6.82E-09	5.20E-04
2496	467100.00	3783060.00	7.19E-08	1.55E-03	6.48E-04	7.33E-09	5.60E-04
2497	467200.00	3783060.00	7.49E-08	1.62E-03	2.10E-04	7.64E-09	5.83E-04
2498	467300.00	3783060.00	7.77E-08	1.67E-03	3.23E-04	7.92E-09	6.04E-04
2499	467400.00	3783060.00	7.95E-08	1.71E-03	3.69E-04	8.10E-09	6.19E-04
2500	467500.00	3783060.00	8.20E-08	1.77E-03	2.59E-04	8.36E-09	6.38E-04
2501	467600.00	3783060.00	7.40E-08	1.59E-03	4.18E-04	7.54E-09	5.76E-04
2502	467700.00	3783060.00	6.08E-08	1.31E-03	2.26E-04	6.19E-09	4.73E-04
2503	467800.00	3783060.00	7.16E-08	1.54E-03	3.19E-04	7.29E-09	5.57E-04
2504	467900.00	3783060.00	7.14E-08	1.54E-03	1.17E-04	7.28E-09	5.56E-04
2505	468000.00	3783060.00	7.39E-08	1.59E-03	2.10E-04	7.53E-09	5.75E-04
2506	468100.00	3783060.00	6.91E-08	1.49E-03	0	7.04E-09	5.37E-04
2507	468200.00	3783060.00	6.83E-08	1.47E-03	3.27E-05	6.96E-09	5.31E-04
2508	468300.00	3783060.00	6.82E-08	1.47E-03	2.45E-05	6.95E-09	5.31E-04
2509	468400.00	3783060.00	6.49E-08	1.40E-03	0	6.61E-09	5.05E-04
2510	468500.00	3783060.00	6.32E-08	1.36E-03	0	6.44E-09	4.92E-04
2511	464900.00	3783160.00	6.39E-08	1.38E-03	0	6.52E-09	4.98E-04
2512	465000.00	3783160.00	5.63E-08	1.21E-03	2.64E-04	5.73E-09	4.38E-04
2513	465100.00	3783160.00	4.77E-08	1.03E-03	2.30E-04	4.86E-09	3.71E-04
2514	465200.00	3783160.00	3.92E-08	8.45E-04	0	3.99E-09	3.05E-04
2515	465300.00	3783160.00	3.18E-08	6.85E-04	5.66E-06	3.24E-09	2.47E-04
2516	465400.00	3783160.00	2.71E-08	5.84E-04	6.58E-05	2.76E-09	2.11E-04
2517	465500.00	3783160.00	2.60E-08	5.59E-04	1.11E-04	2.64E-09	2.02E-04
2518	465600.00	3783160.00	2.87E-08	6.19E-04	1.65E-04	2.92E-09	2.23E-04
2519	465700.00	3783160.00	3.28E-08	7.06E-04	0	3.34E-09	2.55E-04
2520	465800.00	3783160.00	3.44E-08	7.41E-04	5.88E-04	3.50E-09	2.67E-04
2521	465900.00	3783160.00	3.37E-08	7.26E-04	6.12E-05	3.43E-09	2.62E-04
2522	466000.00	3783160.00	3.01E-08	6.48E-04	1.85E-04	3.06E-09	2.34E-04
2523	466100.00	3783160.00	2.95E-08	6.36E-04	2.15E-04	3.01E-09	2.30E-04
2524	466200.00	3783160.00	3.60E-08	7.77E-04	1.21E-04	3.67E-09	2.80E-04
2525	466300.00	3783160.00	4.39E-08	9.46E-04	2.78E-05	4.47E-09	3.41E-04
2526	466400.00	3783160.00	4.86E-08	1.05E-03	4.11E-04	4.95E-09	3.78E-04
2527	466500.00	3783160.00	4.93E-08	1.06E-03	1.63E-04	5.02E-09	3.83E-04
2528	466600.00	3783160.00	4.95E-08	1.07E-03	1.56E-04	5.05E-09	3.86E-04
2529	466700.00	3783160.00	5.09E-08	1.10E-03	7.65E-05	5.19E-09	3.97E-04
2530	466800.00	3783160.00	5.24E-08	1.13E-03	8.38E-04	5.34E-09	4.08E-04

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2531	466900.00	3783160.00	5.42E-08	1.17E-03	0	5.53E-09	4.22E-04
2532	467000.00	3783160.00	5.81E-08	1.25E-03	1.15E-05	5.92E-09	4.52E-04
2533	467100.00	3783160.00	6.22E-08	1.34E-03	6.73E-04	6.34E-09	4.84E-04
2534	467200.00	3783160.00	6.38E-08	1.38E-03	1.61E-04	6.50E-09	4.96E-04
2535	467300.00	3783160.00	6.46E-08	1.39E-03	3.00E-04	6.59E-09	5.03E-04
2536	467400.00	3783160.00	6.82E-08	1.47E-03	3.05E-04	6.95E-09	5.31E-04
2537	467500.00	3783160.00	5.87E-08	1.26E-03	4.14E-04	5.98E-09	4.56E-04
2538	467600.00	3783160.00	6.44E-08	1.39E-03	4.31E-04	6.56E-09	5.01E-04
2539	467700.00	3783160.00	6.11E-08	1.32E-03	0	6.23E-09	4.76E-04
2540	467800.00	3783160.00	5.98E-08	1.29E-03	8.49E-05	6.10E-09	4.66E-04
2541	467900.00	3783160.00	6.03E-08	1.30E-03	8.73E-05	6.15E-09	4.69E-04
2542	468000.00	3783160.00	5.99E-08	1.29E-03	5.18E-04	6.10E-09	4.66E-04
2543	468100.00	3783160.00	5.91E-08	1.27E-03	1.36E-04	6.02E-09	4.60E-04
2544	468200.00	3783160.00	5.79E-08	1.25E-03	1.07E-04	5.90E-09	4.50E-04
2545	468300.00	3783160.00	5.65E-08	1.22E-03	3.75E-05	5.75E-09	4.39E-04
2546	468400.00	3783160.00	5.35E-08	1.15E-03	0	5.45E-09	4.16E-04
2547	468500.00	3783160.00	5.22E-08	1.12E-03	0	5.32E-09	4.06E-04
2548	464900.00	3783260.00	4.51E-08	9.72E-04	2.23E-04	4.60E-09	3.51E-04
2549	465000.00	3783260.00	3.80E-08	8.19E-04	9.28E-05	3.87E-09	2.96E-04
2550	465100.00	3783260.00	3.11E-08	6.70E-04	0	3.17E-09	2.42E-04
2551	465200.00	3783260.00	2.55E-08	5.50E-04	1.99E-06	2.60E-09	1.99E-04
2552	465300.00	3783260.00	2.24E-08	4.82E-04	5.51E-05	2.28E-09	1.74E-04
2553	465400.00	3783260.00	2.23E-08	4.82E-04	1.81E-04	2.28E-09	1.74E-04
2554	465500.00	3783260.00	2.51E-08	5.40E-04	1.54E-04	2.55E-09	1.95E-04
2555	465600.00	3783260.00	2.87E-08	6.18E-04	0	2.92E-09	2.23E-04
2556	465700.00	3783260.00	3.05E-08	6.57E-04	5.40E-04	3.11E-09	2.37E-04
2557	465800.00	3783260.00	2.94E-08	6.33E-04	7.72E-05	2.99E-09	2.28E-04
2558	465900.00	3783260.00	2.59E-08	5.59E-04	2.30E-05	2.64E-09	2.02E-04
2559	466000.00	3783260.00	2.39E-08	5.15E-04	2.33E-04	2.43E-09	1.86E-04
2560	466100.00	3783260.00	2.89E-08	6.24E-04	0	2.95E-09	2.25E-04
2561	466200.00	3783260.00	3.55E-08	7.65E-04	2.00E-04	3.62E-09	2.76E-04
2562	466300.00	3783260.00	4.14E-08	8.93E-04	2.77E-04	4.22E-09	3.22E-04
2563	466400.00	3783260.00	4.29E-08	9.26E-04	1.49E-04	4.38E-09	3.34E-04
2564	466500.00	3783260.00	4.26E-08	9.19E-04	3.06E-04	4.35E-09	3.32E-04
2565	466600.00	3783260.00	4.35E-08	9.38E-04	4.13E-04	4.43E-09	3.39E-04
2566	466700.00	3783260.00	4.48E-08	9.65E-04	3.31E-04	4.56E-09	3.49E-04
2567	466800.00	3783260.00	4.48E-08	9.66E-04	4.95E-04	4.57E-09	3.49E-04
2568	466900.00	3783260.00	4.65E-08	1.00E-03	1.64E-04	4.74E-09	3.62E-04
2569	467000.00	3783260.00	5.17E-08	1.11E-03	2.09E-04	5.26E-09	4.02E-04
2570	467100.00	3783260.00	5.32E-08	1.15E-03	6.55E-04	5.42E-09	4.14E-04
2571	467200.00	3783260.00	5.39E-08	1.16E-03	1.47E-04	5.50E-09	4.20E-04
2572	467300.00	3783260.00	5.59E-08	1.20E-03	2.61E-04	5.69E-09	4.35E-04
2573	467400.00	3783260.00	5.21E-08	1.12E-03	3.19E-04	5.31E-09	4.05E-04
2574	467500.00	3783260.00	5.57E-08	1.20E-03	2.94E-04	5.67E-09	4.33E-04
2575	467600.00	3783260.00	5.65E-08	1.22E-03	3.65E-04	5.76E-09	4.40E-04
2576	467700.00	3783260.00	5.29E-08	1.14E-03	5.41E-05	5.40E-09	4.12E-04
2577	467800.00	3783260.00	5.08E-08	1.10E-03	1.25E-04	5.18E-09	3.95E-04
2578	467900.00	3783260.00	4.98E-08	1.07E-03	3.06E-04	5.07E-09	3.87E-04
2579	468000.00	3783260.00	4.82E-08	1.04E-03	4.61E-04	4.91E-09	3.75E-04
2580	468100.00	3783260.00	4.78E-08	1.03E-03	1.96E-04	4.87E-09	3.72E-04
2581	468200.00	3783260.00	4.61E-08	9.94E-04	0	4.70E-09	3.59E-04
2582	468300.00	3783260.00	4.48E-08	9.66E-04	1.56E-04	4.57E-09	3.49E-04
2583	468400.00	3783260.00	4.35E-08	9.37E-04	1.24E-04	4.43E-09	3.38E-04
2584	468500.00	3783260.00	4.47E-08	9.64E-04	0	4.56E-09	3.48E-04
2585	464900.00	3783360.00	3.04E-08	6.54E-04	0	3.09E-09	2.36E-04

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2586	465000.00	3783360.00	2.49E-08	5.36E-04	0	2.54E-09	1.94E-04
2587	465100.00	3783360.00	2.07E-08	4.47E-04	7.26E-05	2.11E-09	1.61E-04
2588	465200.00	3783360.00	1.88E-08	4.04E-04	3.15E-05	1.91E-09	1.46E-04
2589	465300.00	3783360.00	1.94E-08	4.19E-04	2.56E-04	1.98E-09	1.51E-04
2590	465400.00	3783360.00	2.21E-08	4.77E-04	1.28E-04	2.25E-09	1.72E-04
2591	465500.00	3783360.00	2.52E-08	5.44E-04	0	2.57E-09	1.96E-04
2592	465600.00	3783360.00	2.68E-08	5.79E-04	4.95E-04	2.74E-09	2.09E-04
2593	465700.00	3783360.00	2.57E-08	5.53E-04	1.11E-04	2.62E-09	2.00E-04
2594	465800.00	3783360.00	2.25E-08	4.86E-04	0	2.30E-09	1.75E-04
2595	465900.00	3783360.00	2.04E-08	4.40E-04	2.44E-04	2.08E-09	1.59E-04
2596	466000.00	3783360.00	2.31E-08	4.98E-04	0	2.35E-09	1.80E-04
2597	466100.00	3783360.00	2.87E-08	6.18E-04	2.66E-04	2.92E-09	2.23E-04
2598	466200.00	3783360.00	3.41E-08	7.36E-04	0	3.48E-09	2.66E-04
2599	466300.00	3783360.00	3.69E-08	7.95E-04	3.71E-04	3.76E-09	2.87E-04
2600	466400.00	3783360.00	3.67E-08	7.91E-04	1.53E-04	3.74E-09	2.85E-04
2601	466500.00	3783360.00	3.62E-08	7.79E-04	7.67E-05	3.68E-09	2.81E-04
2602	466600.00	3783360.00	3.77E-08	8.12E-04	1.07E-04	3.84E-09	2.93E-04
2603	466700.00	3783360.00	3.86E-08	8.32E-04	5.38E-04	3.93E-09	3.00E-04
2604	466800.00	3783360.00	3.81E-08	8.20E-04	2.04E-04	3.88E-09	2.96E-04
2605	466900.00	3783360.00	4.28E-08	9.23E-04	4.19E-04	4.36E-09	3.33E-04
2606	467000.00	3783360.00	4.47E-08	9.64E-04	2.34E-04	4.56E-09	3.48E-04
2607	467100.00	3783360.00	4.58E-08	9.86E-04	4.23E-04	4.66E-09	3.56E-04
2608	467200.00	3783360.00	4.60E-08	9.92E-04	1.74E-04	4.69E-09	3.58E-04
2609	467300.00	3783360.00	4.68E-08	1.01E-03	2.58E-04	4.77E-09	3.64E-04
2610	467400.00	3783360.00	4.73E-08	1.02E-03	2.72E-04	4.82E-09	3.68E-04
2611	467500.00	3783360.00	4.69E-08	1.01E-03	2.98E-04	4.78E-09	3.65E-04
2612	467600.00	3783360.00	4.62E-08	9.96E-04	1.41E-04	4.71E-09	3.60E-04
2613	467700.00	3783360.00	4.44E-08	9.57E-04	1.68E-04	4.52E-09	3.46E-04
2614	467800.00	3783360.00	4.17E-08	9.00E-04	0	4.25E-09	3.25E-04
2615	467900.00	3783360.00	4.07E-08	8.76E-04	1.95E-04	4.14E-09	3.16E-04
2616	468000.00	3783360.00	3.99E-08	8.59E-04	0	4.06E-09	3.10E-04
2617	468100.00	3783360.00	3.98E-08	8.58E-04	4.37E-04	4.06E-09	3.10E-04
2618	468200.00	3783360.00	3.85E-08	8.29E-04	1.83E-04	3.92E-09	2.99E-04
2619	468300.00	3783360.00	3.66E-08	7.88E-04	1.58E-04	3.73E-09	2.84E-04
2620	468400.00	3783360.00	3.62E-08	7.80E-04	1.18E-05	3.69E-09	2.82E-04
2621	468500.00	3783360.00	3.62E-08	7.80E-04	3.46E-05	3.69E-09	2.81E-04
2622	464900.00	3783460.00	2.01E-08	4.32E-04	0	2.04E-09	1.56E-04
2623	465000.00	3783460.00	1.70E-08	3.67E-04	1.21E-04	1.73E-09	1.32E-04
2624	465100.00	3783460.00	1.59E-08	3.44E-04	0	1.62E-09	1.24E-04
2625	465200.00	3783460.00	1.71E-08	3.68E-04	2.60E-04	1.74E-09	1.33E-04
2626	465300.00	3783460.00	1.97E-08	4.25E-04	1.01E-04	2.01E-09	1.53E-04
2627	465400.00	3783460.00	2.24E-08	4.83E-04	0	2.29E-09	1.75E-04
2628	465500.00	3783460.00	2.38E-08	5.13E-04	4.57E-04	2.42E-09	1.85E-04
2629	465600.00	3783460.00	2.30E-08	4.95E-04	1.10E-04	2.34E-09	1.79E-04
2630	465700.00	3783460.00	1.99E-08	4.28E-04	0	2.02E-09	1.55E-04
2631	465800.00	3783460.00	1.75E-08	3.78E-04	3.05E-04	1.79E-09	1.37E-04
2632	465900.00	3783460.00	1.86E-08	4.02E-04	0	1.90E-09	1.45E-04
2633	466000.00	3783460.00	2.32E-08	5.01E-04	2.92E-04	2.37E-09	1.81E-04
2634	466100.00	3783460.00	2.83E-08	6.11E-04	0	2.89E-09	2.21E-04
2635	466200.00	3783460.00	3.15E-08	6.78E-04	2.42E-04	3.21E-09	2.45E-04
2636	466300.00	3783460.00	3.18E-08	6.85E-04	8.03E-05	3.24E-09	2.47E-04
2637	466400.00	3783460.00	3.08E-08	6.65E-04	2.88E-04	3.14E-09	2.40E-04
2638	466500.00	3783460.00	3.09E-08	6.67E-04	4.48E-04	3.15E-09	2.41E-04
2639	466600.00	3783460.00	3.06E-08	6.59E-04	1.30E-04	3.12E-09	2.38E-04
2640	466700.00	3783460.00	3.33E-08	7.17E-04	5.92E-04	3.39E-09	2.59E-04

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2641	466800.00	3783460.00	3.47E-08	7.49E-04	0	3.54E-09	2.70E-04
2642	466900.00	3783460.00	3.83E-08	8.25E-04	2.47E-04	3.90E-09	2.98E-04
2643	467000.00	3783460.00	3.95E-08	8.51E-04	2.53E-04	4.02E-09	3.07E-04
2644	467100.00	3783460.00	3.94E-08	8.49E-04	1.69E-04	4.01E-09	3.06E-04
2645	467200.00	3783460.00	3.94E-08	8.50E-04	2.05E-04	4.02E-09	3.07E-04
2646	467300.00	3783460.00	4.05E-08	8.72E-04	2.39E-04	4.12E-09	3.15E-04
2647	467400.00	3783460.00	4.07E-08	8.76E-04	2.51E-04	4.14E-09	3.16E-04
2648	467500.00	3783460.00	4.05E-08	8.73E-04	2.86E-04	4.13E-09	3.15E-04
2649	467600.00	3783460.00	3.89E-08	8.38E-04	2.13E-04	3.96E-09	3.02E-04
2650	467700.00	3783460.00	3.82E-08	8.24E-04	1.79E-04	3.90E-09	2.98E-04
2651	467800.00	3783460.00	3.46E-08	7.47E-04	1.64E-05	3.53E-09	2.70E-04
2652	467900.00	3783460.00	3.38E-08	7.30E-04	7.19E-05	3.45E-09	2.63E-04
2653	468000.00	3783460.00	3.36E-08	7.25E-04	7.90E-05	3.43E-09	2.62E-04
2654	468100.00	3783460.00	3.43E-08	7.40E-04	5.55E-04	3.50E-09	2.67E-04
2655	468200.00	3783460.00	3.30E-08	7.11E-04	1.81E-04	3.36E-09	2.57E-04
2656	468300.00	3783460.00	3.03E-08	6.53E-04	0	3.09E-09	2.36E-04
2657	468400.00	3783460.00	3.01E-08	6.49E-04	2.70E-04	3.07E-09	2.34E-04
2658	468500.00	3783460.00	2.93E-08	6.31E-04	1.21E-04	2.99E-09	2.28E-04
2659	457900.00	3772360.00	-2.73E-10	0	0	-3.12E-11	0
2660	458400.00	3772360.00	-2.95E-10	0	0	-3.37E-11	0
2661	458900.00	3772360.00	-3.17E-10	0	0	-3.62E-11	0
2662	459400.00	3772360.00	-3.38E-10	0	3.93E-06	-3.86E-11	0
2663	459900.00	3772360.00	-3.82E-10	0	0	-4.36E-11	0
2664	460400.00	3772360.00	-4.15E-10	0	3.63E-07	-4.74E-11	0
2665	460900.00	3772360.00	-4.48E-10	0	0	-5.11E-11	0
2666	461400.00	3772360.00	-4.69E-10	0	0	-5.36E-11	0
2667	461900.00	3772360.00	-5.02E-10	0	2.55E-06	-5.73E-11	0
2668	462400.00	3772360.00	-5.46E-10	0	0	-6.23E-11	0
2669	462900.00	3772360.00	-5.89E-10	0	0	-6.73E-11	0
2670	463400.00	3772360.00	-6.22E-10	0	0	-7.11E-11	0
2671	463900.00	3772360.00	-6.55E-10	0	0	-7.48E-11	0
2672	464400.00	3772360.00	-6.99E-10	0	1.95E-06	-7.98E-11	0
2673	464900.00	3772360.00	-7.31E-10	0	0	-8.35E-11	0
2674	465400.00	3772360.00	-7.64E-10	0	0	-8.73E-11	0
2675	465900.00	3772360.00	-7.86E-10	0	0	-8.98E-11	0
2676	466400.00	3772360.00	-7.97E-10	0	0	-9.10E-11	0
2677	466900.00	3772360.00	-8.19E-10	0	0	-9.35E-11	0
2678	467400.00	3772360.00	-8.30E-10	0	0	-9.48E-11	0
2679	467900.00	3772360.00	-8.19E-10	0	0	-9.35E-11	0
2680	468400.00	3772360.00	-8.08E-10	0	0	-9.23E-11	0
2681	468900.00	3772360.00	-7.75E-10	0	0	-8.85E-11	0
2682	469400.00	3772360.00	-7.53E-10	0	0	-8.60E-11	0
2683	469900.00	3772360.00	-7.20E-10	0	2.01E-06	-8.23E-11	0
2684	470400.00	3772360.00	-6.88E-10	0	0	-7.85E-11	0
2685	470900.00	3772360.00	-6.66E-10	0	0	-7.61E-11	0
2686	471400.00	3772360.00	-6.33E-10	0	0	-7.23E-11	0
2687	471900.00	3772360.00	-5.89E-10	0	0	-6.73E-11	0
2688	472400.00	3772360.00	-5.46E-10	0	3.80E-06	-6.23E-11	0
2689	472900.00	3772360.00	-5.13E-10	0	3.11E-06	-5.86E-11	0
2690	473400.00	3772360.00	-4.69E-10	0	0	-5.36E-11	0
2691	473900.00	3772360.00	-4.48E-10	0	1.07E-06	-5.11E-11	0
2692	474400.00	3772360.00	-4.26E-10	0	0	-4.86E-11	0
2693	474900.00	3772360.00	-4.04E-10	0	0	-4.61E-11	0
2694	475400.00	3772360.00	-3.71E-10	0	0	-4.24E-11	0
2695	457900.00	3772860.00	-2.84E-10	0	6.48E-07	-3.24E-11	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2696	458400.00	3772860.00	-3.17E-10	0	0	-3.62E-11	0
2697	458900.00	3772860.00	-3.38E-10	0	0	-3.86E-11	0
2698	459400.00	3772860.00	-3.71E-10	0	3.38E-07	-4.24E-11	0
2699	459900.00	3772860.00	-4.04E-10	0	3.00E-06	-4.61E-11	0
2700	460400.00	3772860.00	-4.48E-10	0	0	-5.11E-11	0
2701	460900.00	3772860.00	-4.91E-10	0	3.23E-07	-5.61E-11	0
2702	461400.00	3772860.00	-5.24E-10	0	0	-5.98E-11	0
2703	461900.00	3772860.00	-5.57E-10	0	4.47E-06	-6.36E-11	0
2704	462400.00	3772860.00	-6.00E-10	0	7.17E-07	-6.86E-11	0
2705	462900.00	3772860.00	-6.55E-10	0	0	-7.48E-11	0
2706	463400.00	3772860.00	-7.10E-10	0	1.23E-06	-8.10E-11	0
2707	463900.00	3772860.00	-7.53E-10	0	0	-8.60E-11	0
2708	464400.00	3772860.00	-7.86E-10	0	0	-8.98E-11	0
2709	464900.00	3772860.00	-8.41E-10	0	0	-9.60E-11	0
2710	465400.00	3772860.00	-8.73E-10	0	0	-9.97E-11	0
2711	465900.00	3772860.00	-9.06E-10	0	0	-1.03E-10	0
2712	466400.00	3772860.00	-9.28E-10	0	0	-1.06E-10	0
2713	466900.00	3772860.00	-9.39E-10	0	0	-1.07E-10	0
2714	467400.00	3772860.00	-9.39E-10	0	0	-1.07E-10	0
2715	467900.00	3772860.00	-9.28E-10	0	0	-1.06E-10	0
2716	468400.00	3772860.00	-9.28E-10	0	0	-1.06E-10	0
2717	468900.00	3772860.00	-8.95E-10	0	0	-1.02E-10	0
2718	469400.00	3772860.00	-8.51E-10	0	7.00E-08	-9.72E-11	0
2719	469900.00	3772860.00	-8.19E-10	0	0	-9.35E-11	0
2720	470400.00	3772860.00	-7.86E-10	0	6.71E-07	-8.98E-11	0
2721	470900.00	3772860.00	-7.42E-10	0	0	-8.48E-11	0
2722	471400.00	3772860.00	-6.99E-10	0	0	-7.98E-11	0
2723	471900.00	3772860.00	-6.44E-10	0	1.58E-07	-7.36E-11	0
2724	472400.00	3772860.00	-6.00E-10	0	0	-6.86E-11	0
2725	472900.00	3772860.00	-5.57E-10	0	4.31E-06	-6.36E-11	0
2726	473400.00	3772860.00	-5.24E-10	0	0	-5.98E-11	0
2727	473900.00	3772860.00	-4.91E-10	0	6.74E-06	-5.61E-11	0
2728	474400.00	3772860.00	-4.58E-10	0	0	-5.24E-11	0
2729	474900.00	3772860.00	-4.26E-10	0	0	-4.86E-11	0
2730	475400.00	3772860.00	-3.93E-10	0	0	-4.49E-11	0
2731	457900.00	3773360.00	-2.95E-10	0	0	-3.37E-11	0
2732	458400.00	3773360.00	-3.17E-10	0	4.66E-07	-3.62E-11	0
2733	458900.00	3773360.00	-3.49E-10	0	0	-3.99E-11	0
2734	459400.00	3773360.00	-3.93E-10	0	0	-4.49E-11	0
2735	459900.00	3773360.00	-4.26E-10	0	3.40E-07	-4.86E-11	0
2736	460400.00	3773360.00	-4.80E-10	0	1.60E-06	-5.49E-11	0
2737	460900.00	3773360.00	-5.24E-10	0	0	-5.98E-11	0
2738	461400.00	3773360.00	-5.79E-10	0	0	-6.61E-11	0
2739	461900.00	3773360.00	-6.11E-10	0	0	-6.98E-11	0
2740	462400.00	3773360.00	-6.66E-10	0	3.78E-06	-7.61E-11	0
2741	462900.00	3773360.00	-7.31E-10	0	0	-8.35E-11	0
2742	463400.00	3773360.00	-7.86E-10	0	0	-8.98E-11	0
2743	463900.00	3773360.00	-8.51E-10	0	0	-9.72E-11	0
2744	464400.00	3773360.00	-9.06E-10	0	0	-1.03E-10	0
2745	464900.00	3773360.00	-9.61E-10	0	1.03E-06	-1.10E-10	0
2746	465400.00	3773360.00	-1.02E-09	0	0	-1.16E-10	0
2747	465900.00	3773360.00	-1.05E-09	0	0	-1.20E-10	0
2748	466400.00	3773360.00	-1.07E-09	0	0	-1.22E-10	0
2749	466900.00	3773360.00	-1.09E-09	0	0	-1.25E-10	0
2750	467400.00	3773360.00	-1.10E-09	0	0	-1.26E-10	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2751	467900.00	3773360.00	-1.08E-09	0	0	-1.23E-10	0
2752	468400.00	3773360.00	-1.07E-09	0	0	-1.22E-10	0
2753	468900.00	3773360.00	-1.03E-09	0	0	-1.17E-10	0
2754	469400.00	3773360.00	-9.82E-10	0	9.89E-07	-1.12E-10	0
2755	469900.00	3773360.00	-9.28E-10	0	0	-1.06E-10	0
2756	470400.00	3773360.00	-8.84E-10	0	0	-1.01E-10	0
2757	470900.00	3773360.00	-8.51E-10	0	0	-9.72E-11	0
2758	471400.00	3773360.00	-7.75E-10	0	0	-8.85E-11	0
2759	471900.00	3773360.00	-7.20E-10	0	5.20E-06	-8.23E-11	0
2760	472400.00	3773360.00	-6.66E-10	0	5.64E-06	-7.61E-11	0
2761	472900.00	3773360.00	-6.11E-10	0	0	-6.98E-11	0
2762	473400.00	3773360.00	-5.79E-10	0	5.79E-06	-6.61E-11	0
2763	473900.00	3773360.00	-5.35E-10	0	0	-6.11E-11	0
2764	474400.00	3773360.00	-4.91E-10	0	0	-5.61E-11	0
2765	474900.00	3773360.00	-4.48E-10	0	0	-5.11E-11	0
2766	475400.00	3773360.00	-4.04E-10	0	1.18E-05	-4.61E-11	0
2767	457900.00	3773860.00	-2.84E-10	0	0	-3.24E-11	0
2768	458400.00	3773860.00	-3.27E-10	0	0	-3.74E-11	0
2769	458900.00	3773860.00	-3.71E-10	0	3.15E-07	-4.24E-11	0
2770	459400.00	3773860.00	-4.15E-10	0	0	-4.74E-11	0
2771	459900.00	3773860.00	-4.58E-10	0	0	-5.24E-11	0
2772	460400.00	3773860.00	-5.13E-10	0	0	-5.86E-11	0
2773	460900.00	3773860.00	-5.68E-10	0	0	-6.48E-11	0
2774	461400.00	3773860.00	-6.33E-10	0	0	-7.23E-11	0
2775	461900.00	3773860.00	-6.88E-10	0	0	-7.85E-11	0
2776	462400.00	3773860.00	-7.42E-10	0	0	-8.48E-11	0
2777	462900.00	3773860.00	-8.19E-10	0	1.80E-06	-9.35E-11	0
2778	463400.00	3773860.00	-8.95E-10	0	0	-1.02E-10	0
2779	463900.00	3773860.00	-9.72E-10	0	9.68E-07	-1.11E-10	0
2780	464400.00	3773860.00	-1.03E-09	0	0	-1.17E-10	0
2781	464900.00	3773860.00	-1.10E-09	0	2.33E-06	-1.26E-10	0
2782	465400.00	3773860.00	-1.17E-09	0	0	-1.33E-10	0
2783	465900.00	3773860.00	-1.22E-09	0	0	-1.40E-10	0
2784	466400.00	3773860.00	-1.26E-09	0	0	-1.43E-10	0
2785	466900.00	3773860.00	-1.29E-09	0	0	-1.47E-10	0
2786	467400.00	3773860.00	-1.29E-09	0	0	-1.47E-10	0
2787	467900.00	3773860.00	-1.28E-09	0	0	-1.46E-10	0
2788	468400.00	3773860.00	-1.26E-09	0	0	-1.43E-10	0
2789	468900.00	3773860.00	-1.20E-09	0	0	-1.37E-10	0
2790	469400.00	3773860.00	-1.14E-09	0	2.02E-06	-1.30E-10	0
2791	469900.00	3773860.00	-1.08E-09	0	0	-1.23E-10	0
2792	470400.00	3773860.00	-1.03E-09	0	0	-1.17E-10	0
2793	470900.00	3773860.00	-9.61E-10	0	0	-1.10E-10	0
2794	471400.00	3773860.00	-8.84E-10	0	6.34E-07	-1.01E-10	0
2795	471900.00	3773860.00	-7.97E-10	0	1.11E-06	-9.10E-11	0
2796	472400.00	3773860.00	-7.31E-10	0	0	-8.35E-11	0
2797	472900.00	3773860.00	-6.77E-10	0	3.10E-06	-7.73E-11	0
2798	473400.00	3773860.00	-6.33E-10	0	0	-7.23E-11	0
2799	473900.00	3773860.00	-5.79E-10	0	0	-6.61E-11	0
2800	474400.00	3773860.00	-5.24E-10	0	0	-5.98E-11	0
2801	474900.00	3773860.00	-4.80E-10	0	1.25E-05	-5.49E-11	0
2802	475400.00	3773860.00	-4.37E-10	0	0	-4.99E-11	0
2803	457900.00	3774360.00	-2.95E-10	0	1.24E-06	-3.37E-11	0
2804	458400.00	3774360.00	-3.27E-10	0	0	-3.74E-11	0
2805	458900.00	3774360.00	-3.82E-10	0	0	-4.36E-11	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2806	459400.00	3774360.00	-4.37E-10	0	2.19E-07	-4.99E-11	0
2807	459900.00	3774360.00	-4.91E-10	0	0	-5.61E-11	0
2808	460400.00	3774360.00	-5.35E-10	0	0	-6.11E-11	0
2809	460900.00	3774360.00	-6.00E-10	0	0	-6.86E-11	0
2810	461400.00	3774360.00	-6.77E-10	0	0	-7.73E-11	0
2811	461900.00	3774360.00	-7.75E-10	0	0	-8.85E-11	0
2812	462400.00	3774360.00	-8.41E-10	0	0	-9.60E-11	0
2813	462900.00	3774360.00	-9.17E-10	0	5.48E-06	-1.05E-10	0
2814	463400.00	3774360.00	-1.00E-09	0	0	-1.15E-10	0
2815	463900.00	3774360.00	-1.10E-09	0	0	-1.26E-10	0
2816	464400.00	3774360.00	-1.19E-09	0	0	-1.36E-10	0
2817	464900.00	3774360.00	-1.28E-09	0	0	-1.46E-10	0
2818	465400.00	3774360.00	-1.36E-09	0	0	-1.56E-10	0
2819	465900.00	3774360.00	-1.44E-09	0	0	-1.65E-10	0
2820	466400.00	3774360.00	-1.48E-09	0	0	-1.70E-10	0
2821	466900.00	3774360.00	-1.52E-09	0	0	-1.73E-10	0
2822	467400.00	3774360.00	-1.53E-09	0	0	-1.75E-10	0
2823	467900.00	3774360.00	-1.52E-09	0	0	-1.73E-10	0
2824	468400.00	3774360.00	-1.47E-09	0	0	-1.68E-10	0
2825	468900.00	3774360.00	-1.40E-09	0	0	-1.60E-10	0
2826	469400.00	3774360.00	-1.33E-09	0	2.56E-06	-1.52E-10	0
2827	469900.00	3774360.00	-1.26E-09	0	3.59E-07	-1.43E-10	0
2828	470400.00	3774360.00	-1.18E-09	0	0	-1.35E-10	0
2829	470900.00	3774360.00	-1.09E-09	0	0	-1.25E-10	0
2830	471400.00	3774360.00	-9.93E-10	0	7.26E-06	-1.13E-10	0
2831	471900.00	3774360.00	-8.95E-10	0	9.05E-06	-1.02E-10	0
2832	472400.00	3774360.00	-8.19E-10	0	0	-9.35E-11	0
2833	472900.00	3774360.00	-7.64E-10	0	0	-8.73E-11	0
2834	473400.00	3774360.00	-6.88E-10	0	0	-7.85E-11	0
2835	473900.00	3774360.00	-6.22E-10	0	0	-7.11E-11	0
2836	474400.00	3774360.00	-5.57E-10	0	1.33E-05	-6.36E-11	0
2837	474900.00	3774360.00	-5.13E-10	0	1.85E-07	-5.86E-11	0
2838	475400.00	3774360.00	-4.80E-10	0	3.58E-06	-5.49E-11	0
2839	457900.00	3774860.00	-2.95E-10	0	0	-3.37E-11	0
2840	458400.00	3774860.00	-3.38E-10	0	2.06E-06	-3.86E-11	0
2841	458900.00	3774860.00	-3.82E-10	0	0	-4.36E-11	0
2842	459400.00	3774860.00	-4.48E-10	0	0	-5.11E-11	0
2843	459900.00	3774860.00	-5.02E-10	0	2.19E-07	-5.73E-11	0
2844	460400.00	3774860.00	-5.79E-10	0	0	-6.61E-11	0
2845	460900.00	3774860.00	-6.55E-10	0	0	-7.48E-11	0
2846	461400.00	3774860.00	-7.31E-10	0	1.59E-06	-8.35E-11	0
2847	461900.00	3774860.00	-8.41E-10	0	0	-9.60E-11	0
2848	462400.00	3774860.00	-9.39E-10	0	0	-1.07E-10	0
2849	462900.00	3774860.00	-1.04E-09	0	0	-1.18E-10	0
2850	463400.00	3774860.00	-1.15E-09	0	3.52E-06	-1.31E-10	0
2851	463900.00	3774860.00	-1.26E-09	0	0	-1.43E-10	0
2852	464400.00	3774860.00	-1.39E-09	0	3.90E-07	-1.58E-10	0
2853	464900.00	3774860.00	-1.50E-09	0	0	-1.71E-10	0
2854	465400.00	3774860.00	-1.62E-09	0	5.41E-07	-1.85E-10	0
2855	465900.00	3774860.00	-1.71E-09	0	0	-1.96E-10	0
2856	466400.00	3774860.00	-1.78E-09	0	0	-2.03E-10	0
2857	466900.00	3774860.00	-1.82E-09	0	0	-2.08E-10	0
2858	467400.00	3774860.00	-1.83E-09	0	0	-2.09E-10	0
2859	467900.00	3774860.00	-1.81E-09	0	0	-2.07E-10	0
2860	468400.00	3774860.00	-1.76E-09	0	0	-2.01E-10	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2861	468900.00	3774860.00	-1.65E-09	0	0	-1.88E-10	0
2862	469400.00	3774860.00	-1.56E-09	0	0	-1.78E-10	0
2863	469900.00	3774860.00	-1.46E-09	0	0	-1.67E-10	0
2864	470400.00	3774860.00	-1.36E-09	0	0	-1.56E-10	0
2865	470900.00	3774860.00	-1.24E-09	0	1.46E-06	-1.42E-10	0
2866	471400.00	3774860.00	-1.11E-09	0	4.61E-06	-1.27E-10	0
2867	471900.00	3774860.00	-1.02E-09	0	0	-1.16E-10	0
2868	472400.00	3774860.00	-9.17E-10	0	7.88E-06	-1.05E-10	0
2869	472900.00	3774860.00	-8.41E-10	0	0	-9.60E-11	0
2870	473400.00	3774860.00	-7.53E-10	0	0	-8.60E-11	0
2871	473900.00	3774860.00	-6.66E-10	0	1.41E-05	-7.61E-11	0
2872	474400.00	3774860.00	-6.11E-10	0	4.66E-07	-6.98E-11	0
2873	474900.00	3774860.00	-5.68E-10	0	4.61E-06	-6.48E-11	0
2874	475400.00	3774860.00	-5.35E-10	0	0	-6.11E-11	0
2875	457900.00	3775360.00	-2.84E-10	0	5.19E-06	-3.24E-11	0
2876	458400.00	3775360.00	-3.27E-10	0	8.23E-07	-3.74E-11	0
2877	458900.00	3775360.00	-3.82E-10	0	0	-4.36E-11	0
2878	459400.00	3775360.00	-4.37E-10	0	0	-4.99E-11	0
2879	459900.00	3775360.00	-5.13E-10	0	0	-5.86E-11	0
2880	460400.00	3775360.00	-6.00E-10	0	0	-6.86E-11	0
2881	460900.00	3775360.00	-6.99E-10	0	0	-7.98E-11	0
2882	461400.00	3775360.00	-7.97E-10	0	0	-9.10E-11	0
2883	461900.00	3775360.00	-9.06E-10	0	3.74E-06	-1.03E-10	0
2884	462400.00	3775360.00	-1.05E-09	0	0	-1.20E-10	0
2885	462900.00	3775360.00	-1.18E-09	0	0	-1.35E-10	0
2886	463400.00	3775360.00	-1.30E-09	0	0	-1.48E-10	0
2887	463900.00	3775360.00	-1.45E-09	0	0	-1.66E-10	0
2888	464400.00	3775360.00	-1.62E-09	0	0	-1.85E-10	0
2889	464900.00	3775360.00	-1.77E-09	0	0	-2.02E-10	0
2890	465400.00	3775360.00	-1.92E-09	0	2.74E-06	-2.19E-10	0
2891	465900.00	3775360.00	-2.06E-09	0	0	-2.36E-10	0
2892	466400.00	3775360.00	-2.15E-09	0	0	-2.46E-10	0
2893	466900.00	3775360.00	-2.22E-09	0	0	-2.53E-10	0
2894	467400.00	3775360.00	-2.23E-09	0	0	-2.54E-10	0
2895	467900.00	3775360.00	-2.21E-09	0	0	-2.52E-10	0
2896	468400.00	3775360.00	-2.12E-09	0	0	-2.42E-10	0
2897	468900.00	3775360.00	-1.98E-09	0	1.13E-06	-2.26E-10	0
2898	469400.00	3775360.00	-1.87E-09	0	0	-2.13E-10	0
2899	469900.00	3775360.00	-1.72E-09	0	0	-1.97E-10	0
2900	470400.00	3775360.00	-1.59E-09	0	0	-1.82E-10	0
2901	470900.00	3775360.00	-1.42E-09	0	6.78E-06	-1.62E-10	0
2902	471400.00	3775360.00	-1.28E-09	0	1.47E-06	-1.46E-10	0
2903	471900.00	3775360.00	-1.15E-09	0	7.16E-06	-1.31E-10	0
2904	472400.00	3775360.00	-1.04E-09	0	0	-1.18E-10	0
2905	472900.00	3775360.00	-9.17E-10	0	0	-1.05E-10	0
2906	473400.00	3775360.00	-8.08E-10	0	1.50E-05	-9.23E-11	0
2907	473900.00	3775360.00	-7.31E-10	0	8.46E-07	-8.35E-11	0
2908	474400.00	3775360.00	-6.66E-10	0	5.90E-06	-7.61E-11	0
2909	474900.00	3775360.00	-6.22E-10	0	0	-7.11E-11	0
2910	475400.00	3775360.00	-5.89E-10	0	0	-6.73E-11	0
2911	457900.00	3775860.00	-2.84E-10	0	0	-3.24E-11	0
2912	458400.00	3775860.00	-3.27E-10	0	0	-3.74E-11	0
2913	458900.00	3775860.00	-3.82E-10	0	3.64E-06	-4.36E-11	0
2914	459400.00	3775860.00	-4.37E-10	0	0	-4.99E-11	0
2915	459900.00	3775860.00	-5.24E-10	0	1.35E-06	-5.98E-11	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2916	460400.00	3775860.00	-6.11E-10	0	0	-6.98E-11	0
2917	460900.00	3775860.00	-7.31E-10	0	0	-8.35E-11	0
2918	461400.00	3775860.00	-8.51E-10	0	0	-9.72E-11	0
2919	461900.00	3775860.00	-9.82E-10	0	0	-1.12E-10	0
2920	462400.00	3775860.00	-1.14E-09	0	5.71E-06	-1.30E-10	0
2921	462900.00	3775860.00	-1.32E-09	0	0	-1.51E-10	0
2922	463400.00	3775860.00	-1.50E-09	0	0	-1.71E-10	0
2923	463900.00	3775860.00	-1.68E-09	0	5.21E-06	-1.92E-10	0
2924	464400.00	3775860.00	-1.90E-09	0	0	-2.17E-10	0
2925	464900.00	3775860.00	-2.12E-09	0	0	-2.42E-10	0
2926	465400.00	3775860.00	-2.33E-09	0	0	-2.66E-10	0
2927	465900.00	3775860.00	-2.52E-09	0	0	-2.88E-10	0
2928	466400.00	3775860.00	-2.66E-09	0	0	-3.04E-10	0
2929	466900.00	3775860.00	-2.75E-09	0	0	-3.14E-10	0
2930	467400.00	3775860.00	-2.77E-09	0	0	-3.17E-10	0
2931	467900.00	3775860.00	-2.70E-09	0	0	-3.08E-10	0
2932	468400.00	3775860.00	-2.58E-09	0	0	-2.94E-10	0
2933	468900.00	3775860.00	-2.40E-09	0	3.16E-06	-2.74E-10	0
2934	469400.00	3775860.00	-2.25E-09	0	0	-2.57E-10	0
2935	469900.00	3775860.00	-2.06E-09	0	0	-2.36E-10	0
2936	470400.00	3775860.00	-1.84E-09	0	2.95E-06	-2.11E-10	0
2937	470900.00	3775860.00	-1.63E-09	0	1.03E-05	-1.86E-10	0
2938	471400.00	3775860.00	-1.45E-09	0	8.65E-07	-1.66E-10	0
2939	471900.00	3775860.00	-1.31E-09	0	0	-1.50E-10	0
2940	472400.00	3775860.00	-1.15E-09	0	0	-1.31E-10	0
2941	472900.00	3775860.00	-1.00E-09	0	1.58E-05	-1.15E-10	0
2942	473400.00	3775860.00	-8.95E-10	0	1.37E-06	-1.02E-10	0
2943	473900.00	3775860.00	-8.08E-10	0	3.63E-06	-9.23E-11	0
2944	474400.00	3775860.00	-7.53E-10	0	0	-8.60E-11	0
2945	474900.00	3775860.00	-6.88E-10	0	0	-7.85E-11	0
2946	475400.00	3775860.00	-6.55E-10	0	0	-7.48E-11	0
2947	457900.00	3776360.00	-2.84E-10	0	1.57E-06	-3.24E-11	0
2948	458400.00	3776360.00	-3.38E-10	0	0	-3.86E-11	0
2949	458900.00	3776360.00	-3.82E-10	0	0	-4.36E-11	0
2950	459400.00	3776360.00	-4.37E-10	0	5.92E-06	-4.99E-11	0
2951	459900.00	3776360.00	-5.13E-10	0	1.18E-07	-5.86E-11	0
2952	460400.00	3776360.00	-6.22E-10	0	1.42E-06	-7.11E-11	0
2953	460900.00	3776360.00	-7.42E-10	0	0	-8.48E-11	0
2954	461400.00	3776360.00	-8.95E-10	0	0	-1.02E-10	0
2955	461900.00	3776360.00	-1.06E-09	0	0	-1.21E-10	0
2956	462400.00	3776360.00	-1.23E-09	0	0	-1.41E-10	0
2957	462900.00	3776360.00	-1.47E-09	0	5.09E-06	-1.68E-10	0
2958	463400.00	3776360.00	-1.72E-09	0	0	-1.97E-10	0
2959	463900.00	3776360.00	-1.96E-09	0	0	-2.24E-10	0
2960	464400.00	3776360.00	-2.23E-09	0	9.57E-07	-2.54E-10	0
2961	464900.00	3776360.00	-2.54E-09	0	0	-2.90E-10	0
2962	465400.00	3776360.00	-2.83E-09	0	0	-3.23E-10	0
2963	465900.00	3776360.00	-3.11E-09	0	0	-3.55E-10	0
2964	466400.00	3776360.00	-3.34E-09	0	0	-3.82E-10	0
2965	466900.00	3776360.00	-3.47E-09	0	0	-3.96E-10	0
2966	467400.00	3776360.00	-3.47E-09	0	0	-3.96E-10	0
2967	467900.00	3776360.00	-3.41E-09	0	0	-3.89E-10	0
2968	468400.00	3776360.00	-3.20E-09	0	0	-3.65E-10	0
2969	468900.00	3776360.00	-2.99E-09	0	0	-3.42E-10	0
2970	469400.00	3776360.00	-2.75E-09	0	0	-3.14E-10	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
2971	469900.00	3776360.00	-2.47E-09	0	0	-2.82E-10	0
2972	470400.00	3776360.00	-2.17E-09	0	3.36E-06	-2.48E-10	0
2973	470900.00	3776360.00	-1.90E-09	0	0	-2.17E-10	0
2974	471400.00	3776360.00	-1.67E-09	0	0	-1.91E-10	0
2975	471900.00	3776360.00	-1.46E-09	0	0	-1.67E-10	0
2976	472400.00	3776360.00	-1.26E-09	0	1.65E-05	-1.43E-10	0
2977	472900.00	3776360.00	-1.11E-09	0	2.09E-06	-1.27E-10	0
2978	473400.00	3776360.00	-1.00E-09	0	0	-1.15E-10	0
2979	473900.00	3776360.00	-9.17E-10	0	4.21E-07	-1.05E-10	0
2980	474400.00	3776360.00	-8.41E-10	0	0	-9.60E-11	0
2981	474900.00	3776360.00	-7.75E-10	0	0	-8.85E-11	0
2982	475400.00	3776360.00	-7.10E-10	0	4.29E-06	-8.10E-11	0
2983	457900.00	3776860.00	-2.84E-10	0	1.11E-05	-3.24E-11	0
2984	458400.00	3776860.00	-3.27E-10	0	1.21E-05	-3.74E-11	0
2985	458900.00	3776860.00	-3.71E-10	0	0	-4.24E-11	0
2986	459400.00	3776860.00	-4.37E-10	0	0	-4.99E-11	0
2987	459900.00	3776860.00	-5.24E-10	0	0	-5.98E-11	0
2988	460400.00	3776860.00	-6.11E-10	0	4.42E-06	-6.98E-11	0
2989	460900.00	3776860.00	-7.31E-10	0	0	-8.35E-11	0
2990	461400.00	3776860.00	-9.06E-10	0	0	-1.03E-10	0
2991	461900.00	3776860.00	-1.11E-09	0	0	-1.27E-10	0
2992	462400.00	3776860.00	-1.34E-09	0	2.39E-07	-1.53E-10	0
2993	462900.00	3776860.00	-1.62E-09	0	0	-1.85E-10	0
2994	463400.00	3776860.00	-1.94E-09	0	0	-2.22E-10	0
2995	463900.00	3776860.00	-2.30E-09	0	0	-2.63E-10	0
2996	464400.00	3776860.00	-2.66E-09	0	0	-3.04E-10	0
2997	464900.00	3776860.00	-3.08E-09	0	0	-3.52E-10	0
2998	465400.00	3776860.00	-3.52E-09	0	0	-4.01E-10	0
2999	465900.00	3776860.00	-3.93E-09	0	2.57E-06	-4.49E-10	0
3000	466400.00	3776860.00	-4.29E-09	0	0	-4.90E-10	0
3001	466900.00	3776860.00	-4.46E-09	0	0	-5.10E-10	0
3002	467400.00	3776860.00	-4.50E-09	0	0	-5.14E-10	0
3003	467900.00	3776860.00	-4.38E-09	0	0	-5.00E-10	0
3004	468400.00	3776860.00	-4.08E-09	0	0	-4.66E-10	0
3005	468900.00	3776860.00	-3.78E-09	0	0	-4.31E-10	0
3006	469400.00	3776860.00	-3.42E-09	0	0	-3.90E-10	0
3007	469900.00	3776860.00	-2.98E-09	0	5.77E-06	-3.40E-10	0
3008	470400.00	3776860.00	-2.57E-09	0	1.33E-05	-2.93E-10	0
3009	470900.00	3776860.00	-2.24E-09	0	7.29E-06	-2.56E-10	0
3010	471400.00	3776860.00	-1.92E-09	0	0	-2.19E-10	0
3011	471900.00	3776860.00	-1.63E-09	0	1.70E-05	-1.86E-10	0
3012	472400.00	3776860.00	-1.42E-09	0	3.12E-06	-1.62E-10	0
3013	472900.00	3776860.00	-1.26E-09	0	0	-1.43E-10	0
3014	473400.00	3776860.00	-1.14E-09	0	0	-1.30E-10	0
3015	473900.00	3776860.00	-1.03E-09	0	0	-1.17E-10	0
3016	474400.00	3776860.00	-9.50E-10	0	5.77E-07	-1.08E-10	0
3017	474900.00	3776860.00	-8.62E-10	0	8.64E-06	-9.85E-11	0
3018	475400.00	3776860.00	-7.86E-10	0	0	-8.98E-11	0
3019	457900.00	3777360.00	-2.73E-10	0	9.79E-07	-3.12E-11	0
3020	458400.00	3777360.00	-3.17E-10	0	0	-3.62E-11	0
3021	458900.00	3777360.00	-3.60E-10	0	1.12E-05	-4.11E-11	0
3022	459400.00	3777360.00	-4.37E-10	0	1.29E-05	-4.99E-11	0
3023	459900.00	3777360.00	-5.13E-10	0	0	-5.86E-11	0
3024	460400.00	3777360.00	-6.11E-10	0	0	-6.98E-11	0
3025	460900.00	3777360.00	-7.42E-10	0	0	-8.48E-11	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3026	461400.00	3777360.00	-8.95E-10	0	0	-1.02E-10	0
3027	461900.00	3777360.00	-1.12E-09	0	1.13E-06	-1.28E-10	0
3028	462400.00	3777360.00	-1.42E-09	0	0	-1.62E-10	0
3029	462900.00	3777360.00	-1.77E-09	0	1.02E-06	-2.02E-10	0
3030	463400.00	3777360.00	-2.16E-09	0	0	-2.47E-10	0
3031	463900.00	3777360.00	-2.67E-09	0	0	-3.05E-10	0
3032	464400.00	3777360.00	-3.21E-09	0	0	-3.67E-10	0
3033	464900.00	3777360.00	-3.78E-09	0	0	-4.31E-10	0
3034	465400.00	3777360.00	-4.44E-09	0	0	-5.07E-10	0
3035	465900.00	3777360.00	-5.05E-09	0	0	-5.77E-10	0
3036	466400.00	3777360.00	-5.61E-09	0	0	-6.41E-10	0
3037	466900.00	3777360.00	-5.89E-09	0	0	-6.73E-10	0
3038	467400.00	3777360.00	-5.99E-09	0	0	-6.84E-10	0
3039	467900.00	3777360.00	-5.80E-09	0	0	-6.62E-10	0
3040	468400.00	3777360.00	-5.40E-09	0	9.78E-07	-6.17E-10	0
3041	468900.00	3777360.00	-4.87E-09	0	0	-5.56E-10	0
3042	469400.00	3777360.00	-4.28E-09	0	0	-4.89E-10	0
3043	469900.00	3777360.00	-3.62E-09	0	8.13E-06	-4.14E-10	0
3044	470400.00	3777360.00	-3.09E-09	0	7.59E-06	-3.53E-10	0
3045	470900.00	3777360.00	-2.61E-09	0	0	-2.98E-10	0
3046	471400.00	3777360.00	-2.17E-09	0	1.68E-05	-2.48E-10	0
3047	471900.00	3777360.00	-1.84E-09	0	4.61E-06	-2.11E-10	0
3048	472400.00	3777360.00	-1.60E-09	0	0	-1.83E-10	0
3049	472900.00	3777360.00	-1.43E-09	0	0	-1.63E-10	0
3050	473400.00	3777360.00	-1.29E-09	0	0	-1.47E-10	0
3051	473900.00	3777360.00	-1.16E-09	0	6.55E-06	-1.32E-10	0
3052	474400.00	3777360.00	-1.05E-09	0	0	-1.20E-10	0
3053	474900.00	3777360.00	-9.50E-10	0	0	-1.08E-10	0
3054	475400.00	3777360.00	-8.51E-10	0	0	-9.72E-11	0
3055	457900.00	3777860.00	-2.62E-10	0	2.52E-06	-2.99E-11	0
3056	458400.00	3777860.00	-2.29E-10	0	2.05E-05	-2.62E-11	0
3057	458900.00	3777860.00	1.53E-10	3.30E-06	6.88E-06	1.56E-11	1.19E-06
3058	459400.00	3777860.00	-4.04E-10	0	0	-4.61E-11	0
3059	459900.00	3777860.00	1.27E-10	2.75E-06	0	1.30E-11	9.92E-07
3060	460400.00	3777860.00	-1.09E-10	0	0	-1.25E-11	0
3061	460900.00	3777860.00	-7.31E-10	0	0	-8.35E-11	0
3062	461400.00	3777860.00	-8.08E-10	0	0	-9.23E-11	0
3063	461900.00	3777860.00	-1.11E-09	0	0	-1.27E-10	0
3064	462400.00	3777860.00	-1.43E-09	0	0	-1.63E-10	0
3065	462900.00	3777860.00	-1.84E-09	0	0	-2.11E-10	0
3066	463400.00	3777860.00	-2.38E-09	0	2.45E-06	-2.72E-10	0
3067	463900.00	3777860.00	-3.01E-09	0	0	-3.44E-10	0
3068	464400.00	3777860.00	-3.83E-09	0	0	-4.38E-10	0
3069	464900.00	3777860.00	-4.68E-09	0	0	-5.35E-10	0
3070	465400.00	3777860.00	-5.64E-09	0	0	-6.45E-10	0
3071	465900.00	3777860.00	-6.67E-09	0	0	-7.62E-10	0
3072	466400.00	3777860.00	-7.52E-09	0	0	-8.59E-10	0
3073	466900.00	3777860.00	-8.13E-09	0	0	-9.29E-10	0
3074	467400.00	3777860.00	-8.23E-09	0	0	-9.40E-10	0
3075	467900.00	3777860.00	-8.02E-09	0	0	-9.16E-10	0
3076	468400.00	3777860.00	-7.30E-09	0	6.29E-06	-8.34E-10	0
3077	468900.00	3777860.00	-6.43E-09	0	0	-7.34E-10	0
3078	469400.00	3777860.00	-5.41E-09	0	1.13E-05	-6.18E-10	0
3079	469900.00	3777860.00	-4.49E-09	0	0	-5.12E-10	0
3080	470400.00	3777860.00	-3.70E-09	0	0	-4.23E-10	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3081	470900.00	3777860.00	-3.00E-09	0	1.55E-05	-3.43E-10	0
3082	471400.00	3777860.00	-2.49E-09	0	6.84E-06	-2.84E-10	0
3083	471900.00	3777860.00	-2.14E-09	0	0	-2.44E-10	0
3084	472400.00	3777860.00	-1.87E-09	0	0	-2.13E-10	0
3085	472900.00	3777860.00	-1.65E-09	0	6.00E-07	-1.88E-10	0
3086	473400.00	3777860.00	-1.47E-09	0	7.11E-06	-1.68E-10	0
3087	473900.00	3777860.00	-1.30E-09	0	0	-1.48E-10	0
3088	474400.00	3777860.00	-1.15E-09	0	0	-1.31E-10	0
3089	474900.00	3777860.00	-1.00E-09	0	0	-1.15E-10	0
3090	475400.00	3777860.00	-8.73E-10	0	5.64E-07	-9.97E-11	0
3091	457900.00	3778360.00	4.33E-10	9.34E-06	0	4.41E-11	3.37E-06
3092	458400.00	3778360.00	1.07E-09	2.31E-05	0	1.09E-10	8.33E-06
3093	458900.00	3778360.00	7.26E-10	1.57E-05	0	7.40E-11	5.65E-06
3094	459400.00	3778360.00	1.04E-09	2.25E-05	0	1.06E-10	8.13E-06
3095	459900.00	3778360.00	6.24E-10	1.35E-05	0	6.36E-11	4.86E-06
3096	460400.00	3778360.00	-2.51E-10	0	1.59E-05	-2.87E-11	0
3097	460900.00	3778360.00	-2.73E-10	0	0	-3.12E-11	0
3098	461400.00	3778360.00	1.15E-09	2.47E-05	0	1.17E-10	8.92E-06
3099	461900.00	3778360.00	1.53E-10	3.30E-06	0	1.56E-11	1.19E-06
3100	462400.00	3778360.00	-9.82E-10	0	0	-1.12E-10	0
3101	462900.00	3778360.00	-1.86E-09	0	0	-2.12E-10	0
3102	463400.00	3778360.00	-2.50E-09	0	0	-2.86E-10	0
3103	463900.00	3778360.00	-3.35E-09	0	1.28E-06	-3.83E-10	0
3104	464400.00	3778360.00	-4.44E-09	0	0	-5.07E-10	0
3105	464900.00	3778360.00	-5.84E-09	0	0	-6.67E-10	0
3106	465400.00	3778360.00	-7.32E-09	0	0	-8.37E-10	0
3107	465900.00	3778360.00	-8.99E-09	0	0	-1.03E-09	0
3108	466400.00	3778360.00	-1.05E-08	0	0	-1.20E-09	0
3109	466900.00	3778360.00	-1.16E-08	0	0	-1.33E-09	0
3110	467400.00	3778360.00	-1.22E-08	0	0	-1.39E-09	0
3111	467900.00	3778360.00	-1.16E-08	0	0	-1.32E-09	0
3112	468400.00	3778360.00	-1.03E-08	0	0	-1.17E-09	0
3113	468900.00	3778360.00	-8.67E-09	0	0	-9.90E-10	0
3114	469400.00	3778360.00	-6.99E-09	0	2.74E-05	-7.98E-10	0
3115	469900.00	3778360.00	-5.60E-09	0	0	-6.40E-10	0
3116	470400.00	3778360.00	-4.39E-09	0	1.16E-05	-5.01E-10	0
3117	470900.00	3778360.00	-3.55E-09	0	3.50E-06	-4.05E-10	0
3118	471400.00	3778360.00	-2.93E-09	0	0	-3.34E-10	0
3119	471900.00	3778360.00	-2.49E-09	0	0	-2.84E-10	0
3120	472400.00	3778360.00	-2.15E-09	0	1.10E-05	-2.46E-10	0
3121	472900.00	3778360.00	-1.87E-09	0	0	-2.13E-10	0
3122	473400.00	3778360.00	-1.62E-09	0	0	-1.85E-10	0
3123	473900.00	3778360.00	-1.39E-09	0	0	-1.58E-10	0
3124	474400.00	3778360.00	-1.17E-09	0	0	-1.33E-10	0
3125	474900.00	3778360.00	-9.82E-10	0	5.34E-06	-1.12E-10	0
3126	475400.00	3778360.00	-8.30E-10	0	1.49E-06	-9.48E-11	0
3127	457900.00	3778860.00	3.06E-10	6.59E-06	0	3.12E-11	2.38E-06
3128	458400.00	3778860.00	1.40E-10	3.02E-06	0	1.43E-11	1.09E-06
3129	458900.00	3778860.00	1.99E-16	1.43E-11	1.64E-06	7.75E-18	4.11E-12
3130	459400.00	3778860.00	-6.55E-11	0	0	-7.48E-12	0
3131	459900.00	3778860.00	-8.66E-17	1.04E-14	0	-3.94E-18	7.93E-15
3132	460400.00	3778860.00	-1.53E-10	0	0	-1.75E-11	0
3133	460900.00	3778860.00	-3.27E-11	0	0	-3.74E-12	0
3134	461400.00	3778860.00	5.10E-11	1.10E-06	0	5.19E-12	3.97E-07
3135	461900.00	3778860.00	7.77E-10	1.68E-05	0	7.92E-11	6.05E-06

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3136	462400.00	3778860.00	2.20E-09	4.75E-05	0	2.25E-10	1.72E-05
3137	462900.00	3778860.00	-5.02E-10	0	0	-5.73E-11	0
3138	463400.00	3778860.00	-2.37E-09	0	0	-2.71E-10	0
3139	463900.00	3778860.00	-3.53E-09	0	0	-4.03E-10	0
3140	464400.00	3778860.00	-5.01E-09	0	0	-5.72E-10	0
3141	464900.00	3778860.00	-7.03E-09	0	0	-8.03E-10	0
3142	465400.00	3778860.00	-9.63E-09	0	0	-1.10E-09	0
3143	465900.00	3778860.00	-1.24E-08	0	0	-1.42E-09	0
3144	466400.00	3778860.00	-1.54E-08	0	1.42E-05	-1.76E-09	0
3145	466900.00	3778860.00	-1.82E-08	0	0	-2.07E-09	0
3146	467400.00	3778860.00	-1.90E-08	0	0	-2.17E-09	0
3147	467900.00	3778860.00	-1.78E-08	0	0	-2.03E-09	0
3148	468400.00	3778860.00	-1.51E-08	0	0	-1.72E-09	0
3149	468900.00	3778860.00	-1.20E-08	0	2.30E-05	-1.37E-09	0
3150	469400.00	3778860.00	-9.18E-09	0	0	-1.05E-09	0
3151	469900.00	3778860.00	-6.91E-09	0	1.98E-06	-7.89E-10	0
3152	470400.00	3778860.00	-5.31E-09	0	5.12E-06	-6.06E-10	0
3153	470900.00	3778860.00	-4.26E-09	0	0	-4.86E-10	0
3154	471400.00	3778860.00	-3.55E-09	0	4.57E-07	-4.05E-10	0
3155	471900.00	3778860.00	-2.91E-09	0	1.64E-06	-3.33E-10	0
3156	472400.00	3778860.00	-2.43E-09	0	0	-2.78E-10	0
3157	472900.00	3778860.00	-2.03E-09	0	0	-2.32E-10	0
3158	473400.00	3778860.00	-1.66E-09	0	0	-1.90E-10	0
3159	473900.00	3778860.00	-1.35E-09	0	3.12E-06	-1.55E-10	0
3160	474400.00	3778860.00	-1.10E-09	0	7.01E-06	-1.26E-10	0
3161	474900.00	3778860.00	-8.95E-10	0	3.09E-06	-1.02E-10	0
3162	475400.00	3778860.00	-7.42E-10	0	2.09E-08	-8.48E-11	0
3163	457900.00	3779360.00	-6.55E-11	0	0	-7.48E-12	0
3164	458400.00	3779360.00	-3.27E-11	0	0	-3.74E-12	0
3165	458900.00	3779360.00	2.55E-11	5.49E-07	0	2.60E-12	1.98E-07
3166	459400.00	3779360.00	-1.80E-16	2.07E-14	4.63E-05	-8.67E-18	1.59E-14
3167	459900.00	3779360.00	-1.31E-10	0	0	-1.50E-11	0
3168	460400.00	3779360.00	-2.95E-10	0	0	-3.37E-11	0
3169	460900.00	3779360.00	-3.06E-10	0	1.15E-06	-3.49E-11	0
3170	461400.00	3779360.00	-2.95E-10	0	0	-3.37E-11	0
3171	461900.00	3779360.00	-2.62E-10	0	0	-2.99E-11	0
3172	462400.00	3779360.00	-1.86E-10	0	0	-2.12E-11	0
3173	462900.00	3779360.00	1.85E-09	3.98E-05	0	1.88E-10	1.44E-05
3174	463400.00	3779360.00	-3.38E-10	0	0	-3.86E-11	0
3175	463900.00	3779360.00	-3.45E-09	0	0	-3.94E-10	0
3176	464400.00	3779360.00	-5.27E-09	0	0	-6.02E-10	0
3177	468900.00	3779360.00	-1.70E-08	0	0	-1.94E-09	0
3178	469400.00	3779360.00	-1.21E-08	0	0	-1.38E-09	0
3179	469900.00	3779360.00	-8.66E-09	0	1.41E-05	-9.89E-10	0
3180	470400.00	3779360.00	-6.65E-09	0	0	-7.59E-10	0
3181	470900.00	3779360.00	-5.28E-09	0	0	-6.03E-10	0
3182	471400.00	3779360.00	-8.41E-09	0	0	-9.60E-10	0
3183	471900.00	3779360.00	-7.73E-09	0	0	-8.83E-10	0
3184	472400.00	3779360.00	-2.51E-09	0	4.22E-06	-2.87E-10	0
3185	472900.00	3779360.00	-1.96E-09	0	2.64E-06	-2.24E-10	0
3186	473400.00	3779360.00	-1.55E-09	0	0	-1.77E-10	0
3187	473900.00	3779360.00	-1.23E-09	0	8.30E-08	-1.41E-10	0
3188	474400.00	3779360.00	-9.93E-10	0	0	-1.13E-10	0
3189	474900.00	3779360.00	-8.19E-10	0	0	-9.35E-11	0
3190	475400.00	3779360.00	-6.88E-10	0	9.02E-08	-7.85E-11	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3191	457900.00	3779860.00	-7.86E-10	0	0	-8.98E-11	0
3192	458400.00	3779860.00	-9.61E-10	0	0	-1.10E-10	0
3193	458900.00	3779860.00	-1.04E-09	0	0	-1.18E-10	0
3194	459400.00	3779860.00	-9.39E-10	0	5.63E-05	-1.07E-10	0
3195	459900.00	3779860.00	-6.44E-10	0	2.66E-05	-7.36E-11	0
3196	460400.00	3779860.00	-2.62E-10	0	0	-2.99E-11	0
3197	460900.00	3779860.00	-7.64E-11	0	0	-8.73E-12	0
3198	461400.00	3779860.00	-2.29E-10	0	1.02E-05	-2.62E-11	0
3199	461900.00	3779860.00	-4.37E-10	0	0	-4.99E-11	0
3200	462400.00	3779860.00	-4.91E-10	0	0	-5.61E-11	0
3201	462900.00	3779860.00	-3.71E-10	0	0	-4.24E-11	0
3202	463400.00	3779860.00	2.22E-09	4.78E-05	0	2.26E-10	1.73E-05
3203	463900.00	3779860.00	-2.43E-09	0	0	-2.78E-10	0
3204	464400.00	3779860.00	-5.26E-09	0	0	-6.01E-10	0
3205	468900.00	3779860.00	-2.46E-08	0	0	-2.81E-09	0
3206	469400.00	3779860.00	-1.60E-08	0	3.65E-05	-1.83E-09	0
3207	469900.00	3779860.00	-1.14E-08	0	0	-1.30E-09	0
3208	470400.00	3779860.00	-1.58E-08	0	0	-1.80E-09	0
3209	470900.00	3779860.00	-1.16E-08	0	0	-1.33E-09	0
3210	471400.00	3779860.00	-4.39E-09	0	4.16E-06	-5.01E-10	0
3211	471900.00	3779860.00	-1.16E-08	0	0	-1.33E-09	0
3212	472400.00	3779860.00	-2.38E-09	0	0	-2.72E-10	0
3213	472900.00	3779860.00	-1.80E-09	0	0	-2.06E-10	0
3214	473400.00	3779860.00	-1.41E-09	0	0	-1.61E-10	0
3215	473900.00	3779860.00	-1.11E-09	0	0	-1.27E-10	0
3216	474400.00	3779860.00	-8.95E-10	0	3.69E-06	-1.02E-10	0
3217	474900.00	3779860.00	-7.20E-10	0	6.35E-08	-8.23E-11	0
3218	475400.00	3779860.00	-5.79E-10	0	0	-6.61E-11	0
3219	457900.00	3780360.00	-6.77E-10	0	0	-7.73E-11	0
3220	458400.00	3780360.00	-8.30E-10	0	0	-9.48E-11	0
3221	458900.00	3780360.00	-1.02E-09	0	0	-1.16E-10	0
3222	459400.00	3780360.00	-1.30E-09	0	0	-1.48E-10	0
3223	459900.00	3780360.00	-1.66E-09	0	0	-1.90E-10	0
3224	460400.00	3780360.00	-2.10E-09	0	0	-2.39E-10	0
3225	460900.00	3780360.00	-2.43E-09	0	0	-2.78E-10	0
3226	461400.00	3780360.00	-2.40E-09	0	2.31E-05	-2.74E-10	0
3227	461900.00	3780360.00	-1.90E-09	0	1.03E-04	-2.17E-10	0
3228	462400.00	3780360.00	-1.11E-09	0	0	-1.27E-10	0
3229	462900.00	3780360.00	-7.75E-10	0	2.73E-05	-8.85E-11	0
3230	463400.00	3780360.00	-1.20E-10	0	0	-1.37E-11	0
3231	463900.00	3780360.00	3.69E-10	7.96E-06	0	3.77E-11	2.88E-06
3232	464400.00	3780360.00	-4.27E-09	0	3.02E-05	-4.87E-10	0
3233	468900.00	3780360.00	-3.64E-08	0	7.42E-05	-4.16E-09	0
3234	469400.00	3780360.00	-2.24E-08	0	0	-2.56E-09	0
3235	469900.00	3780360.00	-2.80E-08	0	0	-3.20E-09	0
3236	470400.00	3780360.00	-2.83E-08	0	0	-3.23E-09	0
3237	470900.00	3780360.00	-5.94E-09	0	0	-6.78E-10	0
3238	471400.00	3780360.00	-4.08E-09	0	0	-4.66E-10	0
3239	471900.00	3780360.00	-2.90E-09	0	0	-3.32E-10	0
3240	472400.00	3780360.00	-2.12E-09	0	0	-2.42E-10	0
3241	472900.00	3780360.00	-1.56E-09	0	0	-1.78E-10	0
3242	473400.00	3780360.00	-1.18E-09	0	0	-1.35E-10	0
3243	473900.00	3780360.00	-8.95E-10	0	0	-1.02E-10	0
3244	474400.00	3780360.00	-6.88E-10	0	2.08E-06	-7.85E-11	0
3245	474900.00	3780360.00	-5.35E-10	0	5.92E-06	-6.11E-11	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3246	475400.00	3780360.00	-4.15E-10	0	8.41E-06	-4.74E-11	0
3247	457900.00	3780860.00	-4.37E-10	0	4.71E-06	-4.99E-11	0
3248	458400.00	3780860.00	-4.48E-10	0	3.31E-05	-5.11E-11	0
3249	458900.00	3780860.00	-5.02E-10	0	2.81E-05	-5.73E-11	0
3250	459400.00	3780860.00	-6.11E-10	0	3.04E-05	-6.98E-11	0
3251	459900.00	3780860.00	-7.75E-10	0	2.72E-05	-8.85E-11	0
3252	460400.00	3780860.00	-1.04E-09	0	8.26E-06	-1.18E-10	0
3253	460900.00	3780860.00	-1.43E-09	0	4.47E-06	-1.63E-10	0
3254	461400.00	3780860.00	-1.99E-09	0	0	-2.27E-10	0
3255	461900.00	3780860.00	-2.82E-09	0	0	-3.22E-10	0
3256	462400.00	3780860.00	-3.89E-09	0	0	-4.44E-10	0
3257	462900.00	3780860.00	-4.20E-09	0	0	-4.80E-10	0
3258	463400.00	3780860.00	-2.53E-09	0	0	-2.89E-10	0
3259	463900.00	3780860.00	-1.33E-09	0	0	-1.52E-10	0
3260	464400.00	3780860.00	1.96E-09	4.23E-05	0	2.00E-10	1.53E-05
3261	468900.00	3780860.00	-5.56E-08	0	0	-6.35E-09	0
3262	469400.00	3780860.00	-2.68E-08	0	0	-3.07E-09	0
3263	469900.00	3780860.00	-1.43E-08	0	0	-1.64E-09	0
3264	470400.00	3780860.00	-8.29E-09	0	3.88E-06	-9.46E-10	0
3265	470900.00	3780860.00	-5.05E-09	0	1.32E-06	-5.77E-10	0
3266	471400.00	3780860.00	-3.20E-09	0	0	-3.65E-10	0
3267	471900.00	3780860.00	-2.07E-09	0	0	-2.37E-10	0
3268	472400.00	3780860.00	-1.39E-09	0	0	-1.58E-10	0
3269	472900.00	3780860.00	-9.39E-10	0	0	-1.07E-10	0
3270	473400.00	3780860.00	-6.44E-10	0	0	-7.36E-11	0
3271	473900.00	3780860.00	-4.37E-10	0	0	-4.99E-11	0
3272	474400.00	3780860.00	-2.95E-10	0	0	-3.37E-11	0
3273	474900.00	3780860.00	-1.96E-10	0	0	-2.24E-11	0
3274	475400.00	3780860.00	-1.20E-10	0	2.80E-07	-1.37E-11	0
3275	457900.00	3781360.00	-2.00E-09	0	0	-2.28E-10	0
3276	458400.00	3781360.00	-2.16E-09	0	0	-2.47E-10	0
3277	458900.00	3781360.00	-2.36E-09	0	0	-2.69E-10	0
3278	459400.00	3781360.00	-2.61E-09	0	0	-2.98E-10	0
3279	459900.00	3781360.00	-2.96E-09	0	0	-3.38E-10	0
3280	460400.00	3781360.00	-3.38E-09	0	0	-3.86E-10	0
3281	460900.00	3781360.00	-3.97E-09	0	7.38E-06	-4.54E-10	0
3282	461400.00	3781360.00	-4.78E-09	0	2.69E-05	-5.46E-10	0
3283	461900.00	3781360.00	-5.97E-09	0	3.74E-05	-6.82E-10	0
3284	462400.00	3781360.00	-7.77E-09	0	2.68E-05	-8.88E-10	0
3285	462900.00	3781360.00	-1.03E-08	0	0	-1.17E-09	0
3286	463400.00	3781360.00	-8.91E-09	0	0	-1.02E-09	0
3287	463900.00	3781360.00	-1.42E-08	0	0	-1.62E-09	0
3288	464400.00	3781360.00	-1.45E-08	0	0	-1.66E-09	0
3289	468900.00	3781360.00	-3.07E-08	0	0	-3.50E-09	0
3290	469400.00	3781360.00	-9.19E-09	0	0	-1.05E-09	0
3291	469900.00	3781360.00	-2.97E-09	0	0	-3.39E-10	0
3292	470400.00	3781360.00	-8.19E-10	0	0	-9.35E-11	0
3293	470900.00	3781360.00	1.27E-11	2.74E-07	0	1.30E-12	9.91E-08
3294	471400.00	3781360.00	3.95E-10	8.51E-06	0	4.03E-11	3.07E-06
3295	471900.00	3781360.00	5.35E-10	1.15E-05	0	5.45E-11	4.16E-06
3296	472400.00	3781360.00	5.73E-10	1.24E-05	0	5.84E-11	4.46E-06
3297	472900.00	3781360.00	5.73E-10	1.24E-05	0	5.84E-11	4.46E-06
3298	473400.00	3781360.00	5.48E-10	1.18E-05	0	5.58E-11	4.26E-06
3299	473900.00	3781360.00	5.22E-10	1.13E-05	0	5.32E-11	4.07E-06
3300	474400.00	3781360.00	5.10E-10	1.10E-05	0	5.19E-11	3.97E-06

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3301	474900.00	3781360.00	4.71E-10	1.02E-05	0	4.80E-11	3.67E-06
3302	475400.00	3781360.00	4.33E-10	9.34E-06	0	4.41E-11	3.37E-06
3303	457900.00	3781860.00	-3.36E-09	0	1.39E-05	-3.84E-10	0
3304	458400.00	3781860.00	-4.13E-09	0	3.69E-06	-4.71E-10	0
3305	458900.00	3781860.00	-5.05E-09	0	0	-5.77E-10	0
3306	459400.00	3781860.00	-5.86E-09	0	0	-6.69E-10	0
3307	459900.00	3781860.00	-7.15E-09	0	0	-8.17E-10	0
3308	460400.00	3781860.00	-8.91E-09	0	0	-1.02E-09	0
3309	460900.00	3781860.00	-1.13E-08	0	0	-1.29E-09	0
3310	461400.00	3781860.00	-1.49E-08	0	0	-1.70E-09	0
3311	461900.00	3781860.00	-2.00E-08	0	4.47E-05	-2.28E-09	0
3312	462400.00	3781860.00	-2.78E-08	0	1.51E-05	-3.17E-09	0
3313	462900.00	3781860.00	-3.09E-08	0	0	-3.53E-09	0
3314	463400.00	3781860.00	-4.36E-08	0	0	-4.98E-09	0
3315	463900.00	3781860.00	-6.73E-08	0	0	-7.69E-09	0
3316	464400.00	3781860.00	-9.23E-08	0	0	-1.05E-08	0
3317	468900.00	3781860.00	7.57E-08	1.63E-03	2.28E-06	7.72E-09	5.89E-04
3318	469400.00	3781860.00	3.61E-08	7.77E-04	2.65E-05	3.67E-09	2.81E-04
3319	469900.00	3781860.00	1.98E-08	4.27E-04	8.88E-06	2.02E-09	1.54E-04
3320	470400.00	3781860.00	1.21E-08	2.61E-04	3.65E-06	1.23E-09	9.41E-05
3321	470900.00	3781860.00	7.92E-09	1.71E-04	3.42E-06	8.08E-10	6.17E-05
3322	471400.00	3781860.00	5.50E-09	1.19E-04	1.70E-06	5.61E-10	4.28E-05
3323	471900.00	3781860.00	4.05E-09	8.73E-05	5.75E-06	4.13E-10	3.15E-05
3324	472400.00	3781860.00	3.06E-09	6.59E-05	1.62E-05	3.12E-10	2.38E-05
3325	472900.00	3781860.00	2.37E-09	5.11E-05	2.42E-05	2.42E-10	1.84E-05
3326	473400.00	3781860.00	1.90E-09	4.09E-05	2.29E-05	1.93E-10	1.48E-05
3327	473900.00	3781860.00	1.58E-09	3.41E-05	1.91E-05	1.61E-10	1.23E-05
3328	474400.00	3781860.00	1.48E-09	3.19E-05	1.67E-05	1.51E-10	1.15E-05
3329	474900.00	3781860.00	3.04E-09	6.56E-05	0	3.10E-10	2.37E-05
3330	475400.00	3781860.00	5.61E-10	1.21E-05	0	5.71E-11	4.36E-06
3331	457900.00	3782360.00	-4.17E-09	0	0	-4.76E-10	0
3332	458400.00	3782360.00	-4.99E-09	0	0	-5.70E-10	0
3333	458900.00	3782360.00	-6.13E-09	0	0	-7.01E-10	0
3334	459400.00	3782360.00	-7.83E-09	0	0	-8.94E-10	0
3335	459900.00	3782360.00	-9.44E-09	0	3.50E-05	-1.08E-09	0
3336	460400.00	3782360.00	-1.17E-08	0	6.17E-05	-1.33E-09	0
3337	460900.00	3782360.00	-1.48E-08	0	2.48E-05	-1.69E-09	0
3338	461400.00	3782360.00	-1.88E-08	0	0	-2.15E-09	0
3339	461900.00	3782360.00	-2.36E-08	0	2.19E-05	-2.69E-09	0
3340	462400.00	3782360.00	-2.90E-08	0	8.83E-05	-3.31E-09	0
3341	462900.00	3782360.00	-3.65E-08	0	0	-4.17E-09	0
3342	463400.00	3782360.00	-3.54E-08	0	0	-4.04E-09	0
3343	463900.00	3782360.00	-1.80E-08	0	0	-2.06E-09	0
3344	464400.00	3782360.00	-5.47E-09	0	2.42E-05	-6.25E-10	0
3345	468900.00	3782360.00	5.86E-08	1.26E-03	6.14E-04	5.97E-09	4.56E-04
3346	469400.00	3782360.00	2.39E-08	5.16E-04	4.17E-05	2.44E-09	1.86E-04
3347	469900.00	3782360.00	1.46E-08	3.14E-04	8.77E-06	1.49E-09	1.14E-04
3348	470400.00	3782360.00	9.86E-09	2.13E-04	1.91E-05	1.01E-09	7.67E-05
3349	470900.00	3782360.00	7.11E-09	1.53E-04	0	7.25E-10	5.53E-05
3350	471400.00	3782360.00	5.44E-09	1.17E-04	0	5.54E-10	4.23E-05
3351	471900.00	3782360.00	4.32E-09	9.31E-05	6.94E-06	4.40E-10	3.36E-05
3352	472400.00	3782360.00	3.47E-09	7.47E-05	2.42E-06	3.53E-10	2.70E-05
3353	472900.00	3782360.00	2.80E-09	6.04E-05	2.76E-06	2.86E-10	2.18E-05
3354	473400.00	3782360.00	2.33E-09	5.03E-05	3.60E-06	2.38E-10	1.81E-05
3355	473900.00	3782360.00	4.09E-09	8.82E-05	0	4.17E-10	3.18E-05

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3356	474400.00	3782360.00	4.17E-09	8.98E-05	2.60E-05	4.25E-10	3.24E-05
3357	474900.00	3782360.00	4.78E-09	1.03E-04	5.90E-05	4.87E-10	3.72E-05
3358	475400.00	3782360.00	4.00E-09	8.62E-05	7.36E-05	4.08E-10	3.11E-05
3359	457900.00	3782860.00	-4.74E-09	0	0	-5.41E-10	0
3360	458400.00	3782860.00	-5.53E-09	0	0	-6.32E-10	0
3361	458900.00	3782860.00	-6.32E-09	0	1.14E-06	-7.22E-10	0
3362	459400.00	3782860.00	-7.19E-09	0	3.70E-05	-8.22E-10	0
3363	459900.00	3782860.00	-7.30E-09	0	2.04E-05	-8.34E-10	0
3364	460400.00	3782860.00	-6.89E-09	0	0	-7.87E-10	0
3365	460900.00	3782860.00	-6.16E-09	0	4.55E-05	-7.03E-10	0
3366	461400.00	3782860.00	-5.33E-09	0	0	-6.08E-10	0
3367	461900.00	3782860.00	-3.79E-09	0	4.66E-05	-4.33E-10	0
3368	462400.00	3782860.00	7.90E-10	1.70E-05	4.74E-05	8.05E-11	6.15E-06
3369	462900.00	3782860.00	1.34E-08	2.88E-04	1.05E-05	1.36E-09	1.04E-04
3370	463400.00	3782860.00	4.11E-08	8.87E-04	4.06E-06	4.19E-09	3.20E-04
3371	463900.00	3782860.00	6.46E-08	1.39E-03	1.13E-04	6.59E-09	5.03E-04
3372	464400.00	3782860.00	1.04E-07	2.25E-03	7.66E-05	1.06E-08	8.12E-04
3373	468900.00	3782860.00	4.26E-08	9.18E-04	2.86E-05	4.34E-09	3.31E-04
3374	469400.00	3782860.00	2.45E-08	5.28E-04	0	2.50E-09	1.91E-04
3375	469900.00	3782860.00	1.18E-08	2.54E-04	1.70E-05	1.20E-09	9.15E-05
3376	470400.00	3782860.00	7.72E-09	1.66E-04	5.71E-05	7.87E-10	6.01E-05
3377	470900.00	3782860.00	1.50E-08	3.22E-04	0	1.52E-09	1.16E-04
3378	471400.00	3782860.00	1.08E-08	2.32E-04	0	1.10E-09	8.38E-05
3379	471900.00	3782860.00	8.47E-09	1.83E-04	0	8.63E-10	6.59E-05
3380	472400.00	3782860.00	7.33E-09	1.58E-04	0	7.47E-10	5.70E-05
3381	472900.00	3782860.00	6.97E-09	1.50E-04	3.12E-05	7.10E-10	5.42E-05
3382	473400.00	3782860.00	4.26E-09	9.17E-05	2.44E-05	4.34E-10	3.31E-05
3383	473900.00	3782860.00	3.75E-09	8.07E-05	0	3.82E-10	2.92E-05
3384	474400.00	3782860.00	3.86E-09	8.32E-05	0	3.93E-10	3.00E-05
3385	474900.00	3782860.00	4.48E-09	9.67E-05	6.18E-06	4.57E-10	3.49E-05
3386	475400.00	3782860.00	3.62E-09	7.80E-05	5.59E-06	3.69E-10	2.82E-05
3387	457900.00	3783360.00	-2.38E-09	0	5.86E-06	-2.72E-10	0
3388	458400.00	3783360.00	-2.16E-09	0	2.41E-05	-2.47E-10	0
3389	458900.00	3783360.00	-2.07E-09	0	0	-2.37E-10	0
3390	459400.00	3783360.00	-1.91E-09	0	0	-2.18E-10	0
3391	459900.00	3783360.00	-1.63E-09	0	3.00E-05	-1.86E-10	0
3392	460400.00	3783360.00	-6.55E-10	0	1.43E-05	-7.48E-11	0
3393	460900.00	3783360.00	2.19E-09	4.72E-05	3.71E-05	2.23E-10	1.71E-05
3394	461400.00	3783360.00	8.46E-09	1.82E-04	0	8.62E-10	6.58E-05
3395	461900.00	3783360.00	1.88E-08	4.05E-04	0	1.92E-09	1.46E-04
3396	462400.00	3783360.00	3.02E-08	6.51E-04	0	3.08E-09	2.35E-04
3397	462900.00	3783360.00	3.61E-08	7.79E-04	3.30E-05	3.68E-09	2.81E-04
3398	463400.00	3783360.00	3.91E-08	8.43E-04	1.30E-04	3.98E-09	3.04E-04
3399	463900.00	3783360.00	4.99E-08	1.08E-03	0	5.08E-09	3.88E-04
3400	464400.00	3783360.00	5.50E-08	1.19E-03	3.26E-05	5.60E-09	4.28E-04
3401	468900.00	3783360.00	2.15E-08	4.63E-04	0	2.19E-09	1.67E-04
3402	469400.00	3783360.00	1.96E-08	4.22E-04	0	2.00E-09	1.52E-04
3403	469900.00	3783360.00	1.49E-08	3.20E-04	0	1.51E-09	1.16E-04
3404	470400.00	3783360.00	9.21E-09	1.99E-04	0	9.39E-10	7.17E-05
3405	470900.00	3783360.00	6.98E-09	1.51E-04	8.40E-05	7.12E-10	5.43E-05
3406	471400.00	3783360.00	4.62E-09	9.97E-05	0	4.71E-10	3.60E-05
3407	471900.00	3783360.00	4.97E-09	1.07E-04	0	5.06E-10	3.87E-05
3408	472400.00	3783360.00	5.53E-09	1.19E-04	1.28E-04	5.64E-10	4.30E-05
3409	472900.00	3783360.00	2.65E-09	5.71E-05	1.15E-05	2.70E-10	2.06E-05
3410	473400.00	3783360.00	1.78E-09	3.85E-05	3.80E-05	1.82E-10	1.39E-05

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3411	473900.00	3783360.00	2.04E-09	4.39E-05	0	2.08E-10	1.59E-05
3412	474400.00	3783360.00	2.00E-09	4.31E-05	2.27E-05	2.04E-10	1.56E-05
3413	474900.00	3783360.00	2.20E-09	4.75E-05	3.30E-05	2.25E-10	1.72E-05
3414	475400.00	3783360.00	1.55E-09	3.35E-05	3.20E-05	1.58E-10	1.21E-05
3415	457900.00	3783860.00	-1.04E-09	0	0	-1.18E-10	0
3416	458400.00	3783860.00	-8.62E-10	0	0	-9.85E-11	0
3417	458900.00	3783860.00	-9.82E-11	0	2.36E-05	-1.12E-11	0
3418	459400.00	3783860.00	1.80E-09	3.87E-05	0	1.83E-10	1.40E-05
3419	459900.00	3783860.00	4.03E-09	8.68E-05	6.58E-06	4.10E-10	3.13E-05
3420	460400.00	3783860.00	8.27E-09	1.78E-04	7.69E-06	8.43E-10	6.43E-05
3421	460900.00	3783860.00	1.23E-08	2.64E-04	4.58E-05	1.25E-09	9.54E-05
3422	461400.00	3783860.00	2.04E-08	4.41E-04	4.67E-05	2.08E-09	1.59E-04
3423	461900.00	3783860.00	2.13E-08	4.59E-04	0	2.17E-09	1.66E-04
3424	462400.00	3783860.00	1.92E-08	4.14E-04	6.32E-05	1.96E-09	1.50E-04
3425	462900.00	3783860.00	2.03E-08	4.38E-04	0	2.07E-09	1.58E-04
3426	463400.00	3783860.00	2.34E-08	5.05E-04	6.74E-05	2.39E-09	1.82E-04
3427	463900.00	3783860.00	2.20E-08	4.74E-04	3.75E-05	2.24E-09	1.71E-04
3428	464400.00	3783860.00	1.09E-08	2.36E-04	0	1.11E-09	8.51E-05
3429	464900.00	3783860.00	1.30E-08	2.80E-04	0	1.33E-09	1.01E-04
3430	465400.00	3783860.00	1.12E-08	2.42E-04	7.52E-05	1.14E-09	8.74E-05
3431	465900.00	3783860.00	1.88E-08	4.05E-04	6.85E-05	1.91E-09	1.46E-04
3432	466400.00	3783860.00	1.81E-08	3.90E-04	0	1.84E-09	1.41E-04
3433	466900.00	3783860.00	2.16E-08	4.65E-04	2.18E-04	2.20E-09	1.68E-04
3434	467400.00	3783860.00	1.99E-08	4.29E-04	2.16E-04	2.03E-09	1.55E-04
3435	467900.00	3783860.00	1.82E-08	3.92E-04	2.55E-05	1.85E-09	1.41E-04
3436	468400.00	3783860.00	1.91E-08	4.11E-04	2.14E-04	1.95E-09	1.49E-04
3437	468900.00	3783860.00	1.51E-08	3.27E-04	1.84E-05	1.54E-09	1.18E-04
3438	469400.00	3783860.00	9.35E-09	2.02E-04	0	9.53E-10	7.28E-05
3439	469900.00	3783860.00	8.14E-09	1.75E-04	3.47E-05	8.30E-10	6.34E-05
3440	470400.00	3783860.00	6.06E-09	1.31E-04	4.40E-05	6.18E-10	4.72E-05
3441	470900.00	3783860.00	1.31E-09	2.83E-05	0	1.34E-10	1.02E-05
3442	471400.00	3783860.00	3.57E-09	7.69E-05	1.06E-04	3.64E-10	2.78E-05
3443	471900.00	3783860.00	1.92E-09	4.15E-05	2.08E-05	1.96E-10	1.50E-05
3444	472400.00	3783860.00	9.94E-10	2.14E-05	5.73E-06	1.01E-10	7.73E-06
3445	472900.00	3783860.00	2.00E-09	4.31E-05	7.93E-05	2.04E-10	1.56E-05
3446	473400.00	3783860.00	3.19E-09	6.87E-05	0	3.25E-10	2.48E-05
3447	473900.00	3783860.00	2.41E-09	5.19E-05	8.10E-06	2.45E-10	1.87E-05
3448	474400.00	3783860.00	1.34E-09	2.88E-05	2.31E-05	1.36E-10	1.04E-05
3449	474900.00	3783860.00	8.66E-10	1.87E-05	0	8.83E-11	6.74E-06
3450	475400.00	3783860.00	1.10E-09	2.36E-05	8.01E-06	1.12E-10	8.53E-06
3451	457900.00	3784360.00	1.24E-09	2.66E-05	0	1.26E-10	9.62E-06
3452	458400.00	3784360.00	2.79E-09	6.01E-05	1.38E-05	2.84E-10	2.17E-05
3453	458900.00	3784360.00	4.75E-09	1.02E-04	0	4.84E-10	3.70E-05
3454	459400.00	3784360.00	6.73E-09	1.45E-04	1.47E-05	6.86E-10	5.24E-05
3455	459900.00	3784360.00	9.05E-09	1.95E-04	0	9.22E-10	7.04E-05
3456	460400.00	3784360.00	1.06E-08	2.29E-04	1.57E-05	1.08E-09	8.25E-05
3457	460900.00	3784360.00	1.11E-08	2.40E-04	2.30E-05	1.14E-09	8.68E-05
3458	461400.00	3784360.00	1.31E-08	2.83E-04	6.31E-05	1.34E-09	1.02E-04
3459	461900.00	3784360.00	1.44E-08	3.10E-04	0	1.47E-09	1.12E-04
3460	462400.00	3784360.00	1.41E-08	3.03E-04	4.58E-05	1.43E-09	1.10E-04
3461	462900.00	3784360.00	1.28E-08	2.75E-04	0	1.30E-09	9.93E-05
3462	463400.00	3784360.00	8.97E-09	1.93E-04	5.23E-05	9.14E-10	6.98E-05
3463	463900.00	3784360.00	3.49E-09	7.53E-05	4.52E-05	3.56E-10	2.72E-05
3464	464400.00	3784360.00	8.28E-09	1.79E-04	0	8.44E-10	6.44E-05
3465	464900.00	3784360.00	6.96E-09	1.50E-04	1.28E-06	7.09E-10	5.41E-05

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3466	465400.00	3784360.00	8.94E-09	1.93E-04	2.89E-04	9.11E-10	6.96E-05
3467	465900.00	3784360.00	9.76E-09	2.10E-04	2.36E-04	9.95E-10	7.60E-05
3468	466400.00	3784360.00	1.02E-08	2.20E-04	1.45E-04	1.04E-09	7.93E-05
3469	466900.00	3784360.00	1.02E-08	2.20E-04	1.42E-04	1.04E-09	7.95E-05
3470	467400.00	3784360.00	9.58E-09	2.07E-04	1.20E-04	9.76E-10	7.46E-05
3471	467900.00	3784360.00	9.08E-09	1.96E-04	1.29E-04	9.26E-10	7.07E-05
3472	468400.00	3784360.00	6.48E-09	1.40E-04	2.16E-04	6.61E-10	5.05E-05
3473	468900.00	3784360.00	5.36E-09	1.16E-04	1.06E-04	5.47E-10	4.17E-05
3474	469400.00	3784360.00	6.28E-09	1.35E-04	0	6.40E-10	4.89E-05
3475	469900.00	3784360.00	2.43E-09	5.25E-05	1.66E-04	2.48E-10	1.89E-05
3476	470400.00	3784360.00	2.51E-09	5.41E-05	1.70E-04	2.56E-10	1.95E-05
3477	470900.00	3784360.00	4.06E-09	8.76E-05	1.22E-04	4.14E-10	3.16E-05
3478	471400.00	3784360.00	3.95E-10	8.51E-06	8.56E-05	4.03E-11	3.07E-06
3479	471900.00	3784360.00	1.24E-09	2.66E-05	0	1.26E-10	9.62E-06
3480	472400.00	3784360.00	2.10E-09	4.53E-05	0	2.14E-10	1.64E-05
3481	472900.00	3784360.00	1.08E-09	2.33E-05	2.66E-05	1.10E-10	8.43E-06
3482	473400.00	3784360.00	5.99E-10	1.29E-05	3.81E-05	6.10E-11	4.66E-06
3483	473900.00	3784360.00	7.77E-10	1.68E-05	0	7.92E-11	6.05E-06
3484	474400.00	3784360.00	1.71E-09	3.68E-05	0	1.74E-10	1.33E-05
3485	474900.00	3784360.00	1.95E-09	4.20E-05	7.98E-06	1.99E-10	1.52E-05
3486	475400.00	3784360.00	1.11E-09	2.39E-05	1.13E-05	1.13E-10	8.63E-06
3487	457900.00	3784860.00	3.96E-09	8.54E-05	3.80E-06	4.04E-10	3.08E-05
3488	458400.00	3784860.00	5.84E-09	1.26E-04	5.71E-06	5.95E-10	4.54E-05
3489	458900.00	3784860.00	7.01E-09	1.51E-04	3.78E-05	7.14E-10	5.45E-05
3490	459400.00	3784860.00	6.85E-09	1.48E-04	0	6.99E-10	5.33E-05
3491	459900.00	3784860.00	6.97E-09	1.50E-04	3.36E-05	7.10E-10	5.42E-05
3492	460400.00	3784860.00	7.19E-09	1.55E-04	2.92E-06	7.32E-10	5.59E-05
3493	460900.00	3784860.00	8.20E-09	1.77E-04	0	8.36E-10	6.39E-05
3494	461400.00	3784860.00	9.58E-09	2.07E-04	1.57E-05	9.76E-10	7.46E-05
3495	461900.00	3784860.00	9.94E-09	2.14E-04	4.20E-05	1.01E-09	7.73E-05
3496	462400.00	3784860.00	7.19E-09	1.55E-04	2.77E-05	7.32E-10	5.59E-05
3497	462900.00	3784860.00	4.83E-09	1.04E-04	0	4.92E-10	3.76E-05
3498	463400.00	3784860.00	1.68E-09	3.63E-05	0	1.71E-10	1.31E-05
3499	463900.00	3784860.00	5.58E-09	1.20E-04	0	5.69E-10	4.34E-05
3500	464400.00	3784860.00	4.70E-09	1.01E-04	0	4.79E-10	3.66E-05
3501	464900.00	3784860.00	3.99E-09	8.60E-05	8.01E-07	4.06E-10	3.10E-05
3502	465400.00	3784860.00	7.11E-09	1.53E-04	3.98E-05	7.25E-10	5.53E-05
3503	465900.00	3784860.00	5.77E-09	1.24E-04	2.32E-04	5.88E-10	4.49E-05
3504	466400.00	3784860.00	5.69E-09	1.23E-04	5.82E-05	5.80E-10	4.43E-05
3505	466900.00	3784860.00	5.34E-09	1.15E-04	6.19E-05	5.44E-10	4.15E-05
3506	467400.00	3784860.00	5.40E-09	1.16E-04	7.97E-05	5.51E-10	4.20E-05
3507	467900.00	3784860.00	5.35E-09	1.15E-04	6.40E-05	5.45E-10	4.16E-05
3508	468400.00	3784860.00	3.61E-09	7.77E-05	9.22E-06	3.67E-10	2.81E-05
3509	468900.00	3784860.00	3.36E-09	7.25E-05	1.00E-04	3.43E-10	2.62E-05
3510	469400.00	3784860.00	3.53E-09	7.61E-05	1.50E-04	3.60E-10	2.75E-05
3511	469900.00	3784860.00	2.47E-09	5.33E-05	1.38E-04	2.52E-10	1.92E-05
3512	470400.00	3784860.00	1.54E-09	3.32E-05	1.38E-04	1.57E-10	1.20E-05
3513	470900.00	3784860.00	1.26E-09	2.72E-05	1.00E-04	1.29E-10	9.82E-06
3514	471400.00	3784860.00	2.90E-09	6.26E-05	4.36E-05	2.96E-10	2.26E-05
3515	471900.00	3784860.00	5.73E-10	1.24E-05	0	5.84E-11	4.46E-06
3516	472400.00	3784860.00	6.37E-11	1.37E-06	0	6.49E-12	4.96E-07
3517	472900.00	3784860.00	9.81E-10	2.11E-05	0	1.00E-10	7.63E-06
3518	473400.00	3784860.00	9.30E-10	2.00E-05	0	9.48E-11	7.24E-06
3519	473900.00	3784860.00	7.39E-10	1.59E-05	1.79E-05	7.53E-11	5.75E-06
3520	474400.00	3784860.00	4.59E-10	9.89E-06	3.04E-05	4.67E-11	3.57E-06

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3521	474900.00	3784860.00	3.31E-10	7.14E-06	0	3.38E-11	2.58E-06
3522	475400.00	3784860.00	7.39E-10	1.59E-05	5.00E-05	7.53E-11	5.75E-06
3523	457900.00	3785360.00	5.08E-09	1.10E-04	1.85E-05	5.18E-10	3.96E-05
3524	458400.00	3785360.00	4.64E-09	1.00E-04	2.57E-06	4.73E-10	3.61E-05
3525	458900.00	3785360.00	4.85E-09	1.05E-04	1.66E-05	4.95E-10	3.78E-05
3526	459400.00	3785360.00	5.10E-09	1.10E-04	1.54E-06	5.19E-10	3.97E-05
3527	459900.00	3785360.00	5.17E-09	1.12E-04	0	5.27E-10	4.03E-05
3528	460400.00	3785360.00	5.90E-09	1.27E-04	2.70E-05	6.01E-10	4.59E-05
3529	460900.00	3785360.00	6.48E-09	1.40E-04	1.72E-06	6.61E-10	5.05E-05
3530	461400.00	3785360.00	5.24E-09	1.13E-04	0	5.34E-10	4.08E-05
3531	461900.00	3785360.00	4.13E-09	8.90E-05	5.57E-05	4.21E-10	3.21E-05
3532	462400.00	3785360.00	2.76E-09	5.96E-05	0	2.82E-10	2.15E-05
3533	462900.00	3785360.00	1.85E-09	3.98E-05	0	1.88E-10	1.44E-05
3534	463400.00	3785360.00	3.94E-09	8.49E-05	0	4.01E-10	3.06E-05
3535	463900.00	3785360.00	3.34E-09	7.20E-05	0	3.40E-10	2.60E-05
3536	464400.00	3785360.00	2.17E-09	4.67E-05	0	2.21E-10	1.69E-05
3537	464900.00	3785360.00	5.10E-09	1.10E-04	2.74E-06	5.19E-10	3.97E-05
3538	465400.00	3785360.00	4.00E-09	8.62E-05	2.09E-04	4.08E-10	3.11E-05
3539	465900.00	3785360.00	3.47E-09	7.47E-05	3.10E-05	3.53E-10	2.70E-05
3540	466400.00	3785360.00	3.94E-09	8.49E-05	2.59E-05	4.01E-10	3.06E-05
3541	466900.00	3785360.00	3.25E-09	7.00E-05	5.02E-05	3.31E-10	2.53E-05
3542	467400.00	3785360.00	3.29E-09	7.09E-05	6.13E-05	3.35E-10	2.56E-05
3543	467900.00	3785360.00	3.26E-09	7.03E-05	1.03E-04	3.32E-10	2.54E-05
3544	468400.00	3785360.00	2.05E-09	4.42E-05	2.87E-05	2.09E-10	1.60E-05
3545	468900.00	3785360.00	2.96E-09	6.37E-05	9.55E-05	3.01E-10	2.30E-05
3546	469400.00	3785360.00	1.39E-09	2.99E-05	1.39E-04	1.42E-10	1.08E-05
3547	469900.00	3785360.00	2.18E-09	4.70E-05	1.43E-04	2.22E-10	1.70E-05
3548	470400.00	3785360.00	1.12E-09	2.42E-05	5.14E-05	1.14E-10	8.73E-06
3549	470900.00	3785360.00	7.39E-10	1.59E-05	6.66E-05	7.53E-11	5.75E-06
3550	471400.00	3785360.00	7.01E-10	1.51E-05	4.76E-05	7.14E-11	5.45E-06
3551	471900.00	3785360.00	1.27E-09	2.75E-05	3.79E-05	1.30E-10	9.92E-06
3552	472400.00	3785360.00	5.48E-10	1.18E-05	0	5.58E-11	4.26E-06
3553	472900.00	3785360.00	1.40E-10	3.02E-06	2.77E-06	1.43E-11	1.09E-06
3554	473400.00	3785360.00	2.93E-10	6.32E-06	0	2.99E-11	2.28E-06
3555	473900.00	3785360.00	1.12E-09	2.42E-05	8.38E-06	1.14E-10	8.73E-06
3556	474400.00	3785360.00	8.03E-10	1.73E-05	3.79E-06	8.18E-11	6.25E-06
3557	474900.00	3785360.00	5.10E-10	1.10E-05	6.23E-06	5.19E-11	3.97E-06
3558	475400.00	3785360.00	3.06E-10	6.59E-06	0	3.12E-11	2.38E-06
3559	457900.00	3785860.00	3.68E-09	7.94E-05	2.41E-05	3.75E-10	2.87E-05
3560	458400.00	3785860.00	3.36E-09	7.25E-05	7.22E-06	3.43E-10	2.62E-05
3561	458900.00	3785860.00	3.76E-09	8.10E-05	0	3.83E-10	2.93E-05
3562	459400.00	3785860.00	3.99E-09	8.60E-05	2.88E-05	4.06E-10	3.10E-05
3563	459900.00	3785860.00	4.42E-09	9.53E-05	2.04E-05	4.51E-10	3.44E-05
3564	460400.00	3785860.00	4.14E-09	8.93E-05	1.50E-05	4.22E-10	3.22E-05
3565	460900.00	3785860.00	2.89E-09	6.23E-05	7.52E-06	2.95E-10	2.25E-05
3566	461400.00	3785860.00	2.48E-09	5.36E-05	8.77E-06	2.53E-10	1.93E-05
3567	461900.00	3785860.00	1.45E-09	3.13E-05	4.85E-05	1.48E-10	1.13E-05
3568	462400.00	3785860.00	1.54E-09	3.32E-05	0	1.57E-10	1.20E-05
3569	462900.00	3785860.00	2.83E-09	6.10E-05	4.37E-06	2.88E-10	2.20E-05
3570	463400.00	3785860.00	2.50E-09	5.38E-05	0	2.54E-10	1.94E-05
3571	463900.00	3785860.00	1.48E-09	3.19E-05	5.34E-05	1.51E-10	1.15E-05
3572	464400.00	3785860.00	3.17E-09	6.84E-05	5.26E-05	3.23E-10	2.47E-05
3573	464900.00	3785860.00	2.88E-09	6.21E-05	6.64E-05	2.93E-10	2.24E-05
3574	465400.00	3785860.00	2.06E-09	4.45E-05	1.14E-04	2.10E-10	1.61E-05
3575	465900.00	3785860.00	2.00E-09	4.31E-05	5.58E-05	2.04E-10	1.56E-05

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3576	466400.00	3785860.00	2.61E-09	5.63E-05	0	2.66E-10	2.03E-05
3577	466900.00	3785860.00	2.19E-09	4.72E-05	3.02E-05	2.23E-10	1.71E-05
3578	467400.00	3785860.00	2.19E-09	4.72E-05	4.84E-05	2.23E-10	1.71E-05
3579	467900.00	3785860.00	2.17E-09	4.67E-05	4.38E-05	2.21E-10	1.69E-05
3580	468400.00	3785860.00	1.63E-09	3.52E-05	3.39E-05	1.66E-10	1.27E-05
3581	468900.00	3785860.00	1.53E-09	3.30E-05	0	1.56E-10	1.19E-05
3582	469400.00	3785860.00	1.31E-09	2.83E-05	0	1.34E-10	1.02E-05
3583	469900.00	3785860.00	1.47E-09	3.16E-05	8.48E-05	1.49E-10	1.14E-05
3584	470400.00	3785860.00	1.35E-09	2.91E-05	0	1.38E-10	1.05E-05
3585	470900.00	3785860.00	4.20E-10	9.06E-06	0	4.28E-11	3.27E-06
3586	471400.00	3785860.00	3.19E-10	6.87E-06	3.84E-06	3.25E-11	2.48E-06
3587	471900.00	3785860.00	4.97E-10	1.07E-05	1.81E-05	5.06E-11	3.87E-06
3588	472400.00	3785860.00	5.73E-10	1.24E-05	5.54E-06	5.84E-11	4.46E-06
3589	472900.00	3785860.00	1.18E-09	2.55E-05	2.37E-05	1.21E-10	9.22E-06
3590	473400.00	3785860.00	1.40E-10	3.02E-06	0	1.43E-11	1.09E-06
3591	473900.00	3785860.00	-1.09E-11	0	4.08E-06	-1.25E-12	0
3592	474400.00	3785860.00	3.69E-10	7.96E-06	0	3.77E-11	2.88E-06
3593	474900.00	3785860.00	3.95E-10	8.51E-06	4.14E-05	4.03E-11	3.07E-06
3594	475400.00	3785860.00	1.91E-10	4.12E-06	0	1.95E-11	1.49E-06
3595	457900.00	3786360.00	2.68E-09	5.77E-05	0	2.73E-10	2.08E-05
3596	458400.00	3786360.00	2.96E-09	6.37E-05	2.77E-05	3.01E-10	2.30E-05
3597	458900.00	3786360.00	3.47E-09	7.47E-05	2.12E-05	3.53E-10	2.70E-05
3598	459400.00	3786360.00	3.55E-09	7.66E-05	1.32E-05	3.62E-10	2.77E-05
3599	459900.00	3786360.00	2.54E-09	5.47E-05	0	2.58E-10	1.97E-05
3600	460400.00	3786360.00	1.82E-09	3.93E-05	1.66E-05	1.86E-10	1.42E-05
3601	460900.00	3786360.00	1.59E-09	3.43E-05	1.13E-05	1.62E-10	1.24E-05
3602	461400.00	3786360.00	5.73E-10	1.24E-05	1.79E-05	5.84E-11	4.46E-06
3603	461900.00	3786360.00	1.35E-09	2.91E-05	6.40E-05	1.38E-10	1.05E-05
3604	462400.00	3786360.00	2.11E-09	4.56E-05	2.16E-05	2.16E-10	1.65E-05
3605	462900.00	3786360.00	1.86E-09	4.01E-05	0	1.90E-10	1.45E-05
3606	463400.00	3786360.00	1.12E-09	2.42E-05	7.26E-05	1.14E-10	8.73E-06
3607	463900.00	3786360.00	1.69E-09	3.65E-05	5.50E-05	1.73E-10	1.32E-05
3608	464400.00	3786360.00	2.27E-09	4.89E-05	7.64E-05	2.31E-10	1.76E-05
3609	464900.00	3786360.00	1.62E-09	3.49E-05	4.78E-05	1.65E-10	1.26E-05
3610	465400.00	3786360.00	1.66E-09	3.57E-05	0	1.69E-10	1.29E-05
3611	465900.00	3786360.00	1.53E-09	3.30E-05	2.97E-05	1.56E-10	1.19E-05
3612	466400.00	3786360.00	1.78E-09	3.85E-05	0	1.82E-10	1.39E-05
3613	466900.00	3786360.00	1.66E-09	3.57E-05	5.36E-05	1.69E-10	1.29E-05
3614	467400.00	3786360.00	1.67E-09	3.60E-05	3.73E-05	1.70E-10	1.30E-05
3615	467900.00	3786360.00	1.53E-09	3.30E-05	2.72E-05	1.56E-10	1.19E-05
3616	468400.00	3786360.00	1.39E-09	2.99E-05	2.35E-05	1.42E-10	1.08E-05
3617	468900.00	3786360.00	6.29E-09	1.36E-04	0	6.41E-10	4.90E-05
3618	469400.00	3786360.00	1.68E-09	3.63E-05	4.43E-05	1.71E-10	1.31E-05
3619	469900.00	3786360.00	5.99E-10	1.29E-05	2.40E-05	6.10E-11	4.66E-06
3620	470400.00	3786360.00	1.50E-09	3.24E-05	0	1.53E-10	1.17E-05
3621	470900.00	3786360.00	1.20E-09	2.58E-05	1.55E-05	1.22E-10	9.32E-06
3622	471400.00	3786360.00	4.20E-10	9.06E-06	2.43E-06	4.28E-11	3.27E-06
3623	471900.00	3786360.00	2.55E-10	5.49E-06	0	2.60E-11	1.98E-06
3624	472400.00	3786360.00	3.82E-10	8.24E-06	2.19E-05	3.90E-11	2.97E-06
3625	472900.00	3786360.00	7.01E-10	1.51E-05	0	7.14E-11	5.45E-06
3626	473400.00	3786360.00	1.30E-09	2.80E-05	5.77E-05	1.32E-10	1.01E-05
3627	473900.00	3786360.00	3.44E-10	7.42E-06	0	3.51E-11	2.68E-06
3628	474400.00	3786360.00	-2.18E-11	0	4.83E-05	-2.49E-12	0
3629	474900.00	3786360.00	1.15E-10	2.47E-06	1.49E-05	1.17E-11	8.92E-07
3630	475400.00	3786360.00	3.06E-10	6.59E-06	0	3.12E-11	2.38E-06

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3631	457900.00	3786860.00	2.51E-09	5.41E-05	2.20E-05	2.56E-10	1.95E-05
3632	458400.00	3786860.00	2.75E-09	5.93E-05	0	2.80E-10	2.14E-05
3633	458900.00	3786860.00	2.29E-09	4.94E-05	0	2.34E-10	1.78E-05
3634	459400.00	3786860.00	1.66E-09	3.57E-05	0	1.69E-10	1.29E-05
3635	459900.00	3786860.00	4.80E-09	1.04E-04	6.55E-06	4.90E-10	3.74E-05
3636	460400.00	3786860.00	1.11E-09	2.39E-05	3.63E-05	1.13E-10	8.63E-06
3637	460900.00	3786860.00	2.93E-10	6.32E-06	0	2.99E-11	2.28E-06
3638	461400.00	3786860.00	1.21E-09	2.61E-05	6.23E-05	1.23E-10	9.42E-06
3639	461900.00	3786860.00	1.64E-09	3.54E-05	2.45E-05	1.67E-10	1.28E-05
3640	462400.00	3786860.00	1.52E-09	3.27E-05	3.64E-06	1.55E-10	1.18E-05
3641	462900.00	3786860.00	8.54E-10	1.84E-05	5.88E-06	8.70E-11	6.64E-06
3642	463400.00	3786860.00	9.43E-10	2.03E-05	1.28E-05	9.61E-11	7.34E-06
3643	463900.00	3786860.00	1.91E-09	4.12E-05	0	1.95E-10	1.49E-05
3644	464400.00	3786860.00	1.47E-09	3.16E-05	6.21E-05	1.49E-10	1.14E-05
3645	464900.00	3786860.00	1.03E-09	2.22E-05	2.80E-05	1.05E-10	8.03E-06
3646	465400.00	3786860.00	1.07E-09	2.31E-05	5.23E-05	1.09E-10	8.33E-06
3647	465900.00	3786860.00	1.40E-09	3.02E-05	0	1.43E-10	1.09E-05
3648	466400.00	3786860.00	1.33E-09	2.86E-05	7.87E-05	1.35E-10	1.03E-05
3649	466900.00	3786860.00	1.17E-09	2.53E-05	2.61E-05	1.19E-10	9.12E-06
3650	467400.00	3786860.00	1.20E-09	2.58E-05	2.93E-05	1.22E-10	9.32E-06
3651	467900.00	3786860.00	7.26E-10	1.57E-05	3.45E-06	7.40E-11	5.65E-06
3652	468400.00	3786860.00	1.04E-09	2.25E-05	2.35E-05	1.06E-10	8.13E-06
3653	468900.00	3786860.00	8.79E-10	1.90E-05	1.55E-05	8.96E-11	6.84E-06
3654	469400.00	3786860.00	1.11E-09	2.39E-05	2.95E-05	1.13E-10	8.63E-06
3655	469900.00	3786860.00	5.35E-10	1.15E-05	0	5.45E-11	4.16E-06
3656	470400.00	3786860.00	5.73E-10	1.24E-05	0	5.84E-11	4.46E-06
3657	470900.00	3786860.00	8.79E-10	1.90E-05	8.20E-05	8.96E-11	6.84E-06
3658	471400.00	3786860.00	8.92E-10	1.92E-05	5.83E-05	9.09E-11	6.94E-06
3659	471900.00	3786860.00	4.46E-10	9.61E-06	0	4.54E-11	3.47E-06
3660	472400.00	3786860.00	1.27E-10	2.75E-06	0	1.30E-11	9.92E-07
3661	472900.00	3786860.00	2.80E-10	6.04E-06	5.68E-06	2.86E-11	2.18E-06
3662	473400.00	3786860.00	4.46E-10	9.61E-06	0	4.54E-11	3.47E-06
3663	473900.00	3786860.00	5.86E-10	1.26E-05	1.71E-05	5.97E-11	4.56E-06
3664	474400.00	3786860.00	2.29E-10	4.94E-06	0	2.34E-11	1.78E-06
3665	474900.00	3786860.00	1.53E-10	3.30E-06	9.42E-06	1.56E-11	1.19E-06
3666	475400.00	3786860.00	6.37E-11	1.37E-06	0	6.49E-12	4.96E-07
3667	457900.00	3787360.00	1.99E-09	4.28E-05	1.17E-05	2.03E-10	1.55E-05
3668	458400.00	3787360.00	1.45E-09	3.13E-05	0	1.48E-10	1.13E-05
3669	458900.00	3787360.00	1.59E-09	3.43E-05	1.24E-05	1.62E-10	1.24E-05
3670	459400.00	3787360.00	9.81E-10	2.11E-05	1.53E-05	1.00E-10	7.63E-06
3671	459900.00	3787360.00	3.89E-09	8.38E-05	1.68E-05	3.96E-10	3.02E-05
3672	460400.00	3787360.00	2.29E-10	4.94E-06	0	2.34E-11	1.78E-06
3673	460900.00	3787360.00	1.07E-09	2.31E-05	4.31E-05	1.09E-10	8.33E-06
3674	461400.00	3787360.00	1.30E-09	2.80E-05	2.43E-05	1.32E-10	1.01E-05
3675	461900.00	3787360.00	1.20E-09	2.58E-05	1.48E-06	1.22E-10	9.32E-06
3676	462400.00	3787360.00	6.62E-10	1.43E-05	1.70E-05	6.75E-11	5.16E-06
3677	462900.00	3787360.00	5.86E-10	1.26E-05	8.95E-07	5.97E-11	4.56E-06
3678	463400.00	3787360.00	1.36E-09	2.94E-05	4.67E-05	1.39E-10	1.06E-05
3679	463900.00	3787360.00	1.18E-09	2.55E-05	1.65E-05	1.21E-10	9.22E-06
3680	464400.00	3787360.00	9.94E-10	2.14E-05	8.57E-06	1.01E-10	7.73E-06
3681	464900.00	3787360.00	1.03E-09	2.22E-05	0	1.05E-10	8.03E-06
3682	465400.00	3787360.00	7.77E-10	1.68E-05	4.05E-05	7.92E-11	6.05E-06
3683	465900.00	3787360.00	1.15E-09	2.47E-05	4.75E-05	1.17E-10	8.92E-06
3684	466400.00	3787360.00	1.02E-09	2.20E-05	9.31E-06	1.04E-10	7.93E-06
3685	466900.00	3787360.00	9.05E-10	1.95E-05	3.38E-05	9.22E-11	7.04E-06

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3686	467400.00	3787360.00	5.48E-10	1.18E-05	1.64E-05	5.58E-11	4.26E-06
3687	467900.00	3787360.00	3.44E-10	7.42E-06	8.37E-06	3.51E-11	2.68E-06
3688	468400.00	3787360.00	5.48E-10	1.18E-05	1.49E-05	5.58E-11	4.26E-06
3689	468900.00	3787360.00	6.50E-10	1.40E-05	3.87E-05	6.62E-11	5.06E-06
3690	469400.00	3787360.00	7.01E-10	1.51E-05	0	7.14E-11	5.45E-06
3691	469900.00	3787360.00	5.22E-10	1.13E-05	5.92E-05	5.32E-11	4.07E-06
3692	470400.00	3787360.00	1.53E-10	3.30E-06	1.14E-05	1.56E-11	1.19E-06
3693	470900.00	3787360.00	4.59E-10	9.89E-06	6.90E-05	4.67E-11	3.57E-06
3694	471400.00	3787360.00	3.95E-10	8.51E-06	1.03E-05	4.03E-11	3.07E-06
3695	471900.00	3787360.00	2.17E-10	4.67E-06	1.83E-05	2.21E-11	1.69E-06
3696	472400.00	3787360.00	2.04E-10	4.39E-06	1.32E-05	2.08E-11	1.59E-06
3697	472900.00	3787360.00	7.64E-11	1.65E-06	0	7.79E-12	5.95E-07
3698	473400.00	3787360.00	1.78E-10	3.85E-06	0	1.82E-11	1.39E-06
3699	473900.00	3787360.00	1.40E-10	3.02E-06	1.23E-05	1.43E-11	1.09E-06
3700	474400.00	3787360.00	4.08E-10	8.79E-06	3.54E-05	4.15E-11	3.17E-06
3701	474900.00	3787360.00	1.02E-10	2.20E-06	2.61E-05	1.04E-11	7.93E-07
3702	475400.00	3787360.00	8.92E-11	1.92E-06	0	9.09E-12	6.94E-07
3703	457900.00	3787860.00	6.50E-10	1.40E-05	0	6.62E-11	5.06E-06
3704	458400.00	3787860.00	4.46E-10	9.61E-06	1.29E-05	4.54E-11	3.47E-06
3705	458900.00	3787860.00	5.73E-10	1.24E-05	0	5.84E-11	4.46E-06
3706	459400.00	3787860.00	8.79E-10	1.90E-05	9.22E-06	8.96E-11	6.84E-06
3707	459900.00	3787860.00	1.66E-10	3.57E-06	8.92E-06	1.69E-11	1.29E-06
3708	460400.00	3787860.00	9.30E-10	2.00E-05	2.02E-06	9.48E-11	7.24E-06
3709	460900.00	3787860.00	1.04E-09	2.25E-05	2.27E-05	1.06E-10	8.13E-06
3710	461400.00	3787860.00	9.43E-10	2.03E-05	1.74E-06	9.61E-11	7.34E-06
3711	461900.00	3787860.00	5.48E-10	1.18E-05	1.64E-05	5.58E-11	4.26E-06
3712	462400.00	3787860.00	4.46E-10	9.61E-06	1.89E-05	4.54E-11	3.47E-06
3713	462900.00	3787860.00	8.41E-10	1.81E-05	0	8.57E-11	6.54E-06
3714	463400.00	3787860.00	1.13E-09	2.44E-05	0	1.16E-10	8.82E-06
3715	463900.00	3787860.00	8.66E-10	1.87E-05	9.37E-06	8.83E-11	6.74E-06
3716	464400.00	3787860.00	5.99E-10	1.29E-05	3.56E-06	6.10E-11	4.66E-06
3717	464900.00	3787860.00	8.03E-10	1.73E-05	2.48E-05	8.18E-11	6.25E-06
3718	465400.00	3787860.00	6.75E-10	1.46E-05	7.99E-06	6.88E-11	5.26E-06
3719	465900.00	3787860.00	9.05E-10	1.95E-05	1.76E-05	9.22E-11	7.04E-06
3720	466400.00	3787860.00	6.75E-10	1.46E-05	3.04E-05	6.88E-11	5.26E-06
3721	466900.00	3787860.00	5.35E-10	1.15E-05	9.47E-06	5.45E-11	4.16E-06
3722	467400.00	3787860.00	2.80E-10	6.04E-06	3.74E-06	2.86E-11	2.18E-06
3723	467900.00	3787860.00	2.55E-10	5.49E-06	6.16E-06	2.60E-11	1.98E-06
3724	468400.00	3787860.00	4.84E-10	1.04E-05	3.60E-06	4.93E-11	3.77E-06
3725	468900.00	3787860.00	6.37E-10	1.37E-05	3.25E-05	6.49E-11	4.96E-06
3726	469400.00	3787860.00	2.55E-10	5.49E-06	1.71E-05	2.60E-11	1.98E-06
3727	469900.00	3787860.00	2.55E-10	5.49E-06	1.24E-06	2.60E-11	1.98E-06
3728	470400.00	3787860.00	1.53E-10	3.30E-06	0	1.56E-11	1.19E-06
3729	470900.00	3787860.00	1.53E-10	3.30E-06	2.37E-05	1.56E-11	1.19E-06
3730	471400.00	3787860.00	1.66E-10	3.57E-06	2.52E-06	1.69E-11	1.29E-06
3731	471900.00	3787860.00	1.53E-10	3.30E-06	1.16E-05	1.56E-11	1.19E-06
3732	472400.00	3787860.00	8.92E-11	1.92E-06	2.17E-05	9.09E-12	6.94E-07
3733	472900.00	3787860.00	1.91E-10	4.12E-06	0	1.95E-11	1.49E-06
3734	473400.00	3787860.00	8.92E-11	1.92E-06	7.57E-07	9.09E-12	6.94E-07
3735	473900.00	3787860.00	1.15E-10	2.47E-06	0	1.17E-11	8.92E-07
3736	474400.00	3787860.00	1.02E-10	2.20E-06	3.28E-07	1.04E-11	7.93E-07
3737	474900.00	3787860.00	1.02E-10	2.20E-06	8.01E-06	1.04E-11	7.93E-07
3738	475400.00	3787860.00	8.92E-11	1.92E-06	0	9.09E-12	6.94E-07
3739	457900.00	3788360.00	4.46E-10	9.61E-06	0	4.54E-11	3.47E-06
3740	458400.00	3788360.00	4.46E-10	9.61E-06	2.42E-05	4.54E-11	3.47E-06

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3741	458900.00	3788360.00	1.02E-10	2.20E-06	0	1.04E-11	7.93E-07
3742	459400.00	3788360.00	2.55E-10	5.49E-06	0	2.60E-11	1.98E-06
3743	459900.00	3788360.00	8.03E-10	1.73E-05	0	8.18E-11	6.25E-06
3744	460400.00	3788360.00	8.28E-10	1.79E-05	2.12E-05	8.44E-11	6.44E-06
3745	460900.00	3788360.00	7.90E-10	1.70E-05	4.22E-06	8.05E-11	6.15E-06
3746	461400.00	3788360.00	4.59E-10	9.89E-06	0	4.67E-11	3.57E-06
3747	461900.00	3788360.00	3.69E-10	7.96E-06	3.47E-05	3.77E-11	2.88E-06
3748	462400.00	3788360.00	5.10E-10	1.10E-05	0	5.19E-11	3.97E-06
3749	462900.00	3788360.00	9.81E-10	2.11E-05	0	1.00E-10	7.63E-06
3750	463400.00	3788360.00	6.88E-10	1.48E-05	0	7.01E-11	5.35E-06
3751	463900.00	3788360.00	6.37E-10	1.37E-05	0	6.49E-11	4.96E-06
3752	464400.00	3788360.00	6.50E-10	1.40E-05	1.57E-05	6.62E-11	5.06E-06
3753	464900.00	3788360.00	4.84E-10	1.04E-05	1.82E-05	4.93E-11	3.77E-06
3754	465400.00	3788360.00	6.50E-10	1.40E-05	5.55E-06	6.62E-11	5.06E-06
3755	465900.00	3788360.00	6.75E-10	1.46E-05	5.83E-06	6.88E-11	5.26E-06
3756	466400.00	3788360.00	3.31E-10	7.14E-06	6.66E-06	3.38E-11	2.58E-06
3757	466900.00	3788360.00	2.80E-10	6.04E-06	6.52E-06	2.86E-11	2.18E-06
3758	467400.00	3788360.00	2.17E-10	4.67E-06	1.32E-06	2.21E-11	1.69E-06
3759	467900.00	3788360.00	2.04E-10	4.39E-06	1.49E-06	2.08E-11	1.59E-06
3760	468400.00	3788360.00	2.42E-10	5.22E-06	0	2.47E-11	1.88E-06
3761	468900.00	3788360.00	3.19E-10	6.87E-06	2.43E-05	3.25E-11	2.48E-06
3762	469400.00	3788360.00	2.29E-10	4.94E-06	0	2.34E-11	1.78E-06
3763	469900.00	3788360.00	1.66E-10	3.57E-06	3.46E-07	1.69E-11	1.29E-06
3764	470400.00	3788360.00	1.53E-10	3.30E-06	2.48E-06	1.56E-11	1.19E-06
3765	470900.00	3788360.00	1.40E-10	3.02E-06	0	1.43E-11	1.09E-06
3766	471400.00	3788360.00	1.40E-10	3.02E-06	9.22E-07	1.43E-11	1.09E-06
3767	471900.00	3788360.00	1.40E-10	3.02E-06	1.00E-06	1.43E-11	1.09E-06
3768	472400.00	3788360.00	1.27E-10	2.75E-06	4.37E-06	1.30E-11	9.92E-07
3769	472900.00	3788360.00	1.02E-10	2.20E-06	6.62E-06	1.04E-11	7.93E-07
3770	473400.00	3788360.00	8.92E-11	1.92E-06	9.41E-06	9.09E-12	6.94E-07
3771	473900.00	3788360.00	8.92E-11	1.92E-06	5.47E-07	9.09E-12	6.94E-07
3772	474400.00	3788360.00	1.02E-10	2.20E-06	8.48E-06	1.04E-11	7.93E-07
3773	474900.00	3788360.00	7.64E-11	1.65E-06	0	7.79E-12	5.95E-07
3774	475400.00	3788360.00	1.27E-10	2.75E-06	3.00E-06	1.30E-11	9.92E-07
3775	457900.00	3788860.00	3.69E-10	7.96E-06	1.98E-05	3.77E-11	2.88E-06
3776	458400.00	3788860.00	5.10E-11	1.10E-06	5.71E-06	5.19E-12	3.97E-07
3777	458900.00	3788860.00	3.06E-10	6.59E-06	0	3.12E-11	2.38E-06
3778	459400.00	3788860.00	7.01E-10	1.51E-05	0	7.14E-11	5.45E-06
3779	459900.00	3788860.00	6.62E-10	1.43E-05	1.99E-05	6.75E-11	5.16E-06
3780	460400.00	3788860.00	6.62E-10	1.43E-05	7.40E-06	6.75E-11	5.16E-06
3781	460900.00	3788860.00	4.08E-10	8.79E-06	0	4.15E-11	3.17E-06
3782	461400.00	3788860.00	3.06E-10	6.59E-06	0	3.12E-11	2.38E-06
3783	461900.00	3788860.00	3.19E-10	6.87E-06	1.77E-06	3.25E-11	2.48E-06
3784	462400.00	3788860.00	7.52E-10	1.62E-05	2.32E-05	7.66E-11	5.85E-06
3785	462900.00	3788860.00	7.01E-10	1.51E-05	4.41E-05	7.14E-11	5.45E-06
3786	463400.00	3788860.00	5.99E-10	1.29E-05	0	6.10E-11	4.66E-06
3787	463900.00	3788860.00	3.44E-10	7.42E-06	1.74E-05	3.51E-11	2.68E-06
3788	464400.00	3788860.00	5.35E-10	1.15E-05	1.80E-06	5.45E-11	4.16E-06
3789	464900.00	3788860.00	2.42E-10	5.22E-06	2.61E-05	2.47E-11	1.88E-06
3790	465400.00	3788860.00	4.33E-10	9.34E-06	7.23E-06	4.41E-11	3.37E-06
3791	465900.00	3788860.00	4.08E-10	8.79E-06	0	4.15E-11	3.17E-06
3792	466400.00	3788860.00	3.82E-10	8.24E-06	5.72E-06	3.90E-11	2.97E-06
3793	466900.00	3788860.00	2.17E-10	4.67E-06	0	2.21E-11	1.69E-06
3794	467400.00	3788860.00	1.78E-10	3.85E-06	1.18E-06	1.82E-11	1.39E-06
3795	467900.00	3788860.00	1.78E-10	3.85E-06	1.36E-06	1.82E-11	1.39E-06

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3796	468400.00	3788860.00	2.04E-10	4.39E-06	4.40E-06	2.08E-11	1.59E-06
3797	468900.00	3788860.00	2.55E-10	5.49E-06	1.46E-05	2.60E-11	1.98E-06
3798	469400.00	3788860.00	1.78E-10	3.85E-06	9.05E-06	1.82E-11	1.39E-06
3799	469900.00	3788860.00	1.40E-10	3.02E-06	0	1.43E-11	1.09E-06
3800	470400.00	3788860.00	1.53E-10	3.30E-06	1.62E-07	1.56E-11	1.19E-06
3801	470900.00	3788860.00	1.15E-10	2.47E-06	0	1.17E-11	8.92E-07
3802	471400.00	3788860.00	1.15E-10	2.47E-06	0	1.17E-11	8.92E-07
3803	471900.00	3788860.00	1.27E-10	2.75E-06	2.75E-06	1.30E-11	9.92E-07
3804	472400.00	3788860.00	1.15E-10	2.47E-06	0	1.17E-11	8.92E-07
3805	472900.00	3788860.00	1.02E-10	2.20E-06	2.65E-06	1.04E-11	7.93E-07
3806	473400.00	3788860.00	7.64E-11	1.65E-06	9.44E-06	7.79E-12	5.95E-07
3807	473900.00	3788860.00	8.92E-11	1.92E-06	6.69E-06	9.09E-12	6.94E-07
3808	474400.00	3788860.00	7.64E-11	1.65E-06	0	7.79E-12	5.95E-07
3809	474900.00	3788860.00	1.02E-10	2.20E-06	5.18E-06	1.04E-11	7.93E-07
3810	475400.00	3788860.00	7.64E-11	1.65E-06	0	7.79E-12	5.95E-07
3811	457900.00	3789360.00	-1.09E-11	0	0	-1.25E-12	0
3812	458400.00	3789360.00	3.31E-10	7.14E-06	5.89E-06	3.38E-11	2.58E-06
3813	458900.00	3789360.00	6.12E-10	1.32E-05	0	6.23E-11	4.76E-06
3814	459400.00	3789360.00	5.61E-10	1.21E-05	1.73E-05	5.71E-11	4.36E-06
3815	459900.00	3789360.00	5.48E-10	1.18E-05	1.12E-05	5.58E-11	4.26E-06
3816	460400.00	3789360.00	3.44E-10	7.42E-06	0	3.51E-11	2.68E-06
3817	460900.00	3789360.00	2.42E-10	5.22E-06	1.23E-05	2.47E-11	1.88E-06
3818	461400.00	3789360.00	2.29E-10	4.94E-06	4.24E-06	2.34E-11	1.78E-06
3819	461900.00	3789360.00	3.50E-09	7.55E-05	4.91E-06	3.57E-10	2.73E-05
3820	462400.00	3789360.00	6.37E-10	1.37E-05	0	6.49E-11	4.96E-06
3821	462900.00	3789360.00	4.08E-10	8.79E-06	2.28E-05	4.15E-11	3.17E-06
3822	463400.00	3789360.00	3.19E-10	6.87E-06	0	3.25E-11	2.48E-06
3823	463900.00	3789360.00	2.55E-10	5.49E-06	1.07E-05	2.60E-11	1.98E-06
3824	464400.00	3789360.00	4.08E-10	8.79E-06	2.19E-05	4.15E-11	3.17E-06
3825	464900.00	3789360.00	1.66E-10	3.57E-06	1.25E-05	1.69E-11	1.29E-06
3826	465400.00	3789360.00	2.93E-10	6.32E-06	2.85E-05	2.99E-11	2.28E-06
3827	465900.00	3789360.00	3.06E-10	6.59E-06	1.99E-05	3.12E-11	2.38E-06
3828	466400.00	3789360.00	1.91E-10	4.12E-06	1.68E-05	1.95E-11	1.49E-06
3829	466900.00	3789360.00	2.17E-10	4.67E-06	1.14E-06	2.21E-11	1.69E-06
3830	467400.00	3789360.00	1.53E-10	3.30E-06	1.06E-06	1.56E-11	1.19E-06
3831	467900.00	3789360.00	1.53E-10	3.30E-06	1.23E-06	1.56E-11	1.19E-06
3832	468400.00	3789360.00	1.53E-10	3.30E-06	0	1.56E-11	1.19E-06
3833	468900.00	3789360.00	1.66E-10	3.57E-06	1.98E-06	1.69E-11	1.29E-06
3834	469400.00	3789360.00	1.53E-10	3.30E-06	0	1.56E-11	1.19E-06
3835	469900.00	3789360.00	1.40E-10	3.02E-06	1.99E-06	1.43E-11	1.09E-06
3836	470400.00	3789360.00	1.40E-10	3.02E-06	0	1.43E-11	1.09E-06
3837	470900.00	3789360.00	1.53E-10	3.30E-06	2.93E-06	1.56E-11	1.19E-06
3838	471400.00	3789360.00	1.02E-10	2.20E-06	1.68E-05	1.04E-11	7.93E-07
3839	471900.00	3789360.00	1.02E-10	2.20E-06	0	1.04E-11	7.93E-07
3840	472400.00	3789360.00	1.40E-10	3.02E-06	7.88E-06	1.43E-11	1.09E-06
3841	472900.00	3789360.00	1.02E-10	2.20E-06	1.78E-05	1.04E-11	7.93E-07
3842	473400.00	3789360.00	7.64E-11	1.65E-06	1.21E-06	7.79E-12	5.95E-07
3843	473900.00	3789360.00	6.37E-11	1.37E-06	3.35E-06	6.49E-12	4.96E-07
3844	474400.00	3789360.00	7.64E-11	1.65E-06	9.75E-07	7.79E-12	5.95E-07
3845	474900.00	3789360.00	6.37E-11	1.37E-06	0	6.49E-12	4.96E-07
3846	475400.00	3789360.00	8.92E-11	1.92E-06	6.46E-06	9.09E-12	6.94E-07
3847	457900.00	3789860.00	3.44E-10	7.42E-06	1.98E-05	3.51E-11	2.68E-06
3848	458400.00	3789860.00	5.10E-10	1.10E-05	0	5.19E-11	3.97E-06
3849	458900.00	3789860.00	4.59E-10	9.89E-06	1.65E-05	4.67E-11	3.57E-06
3850	459400.00	3789860.00	4.71E-10	1.02E-05	1.48E-05	4.80E-11	3.67E-06

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3851	459900.00	3789860.00	3.19E-10	6.87E-06	3.97E-06	3.25E-11	2.48E-06
3852	460400.00	3789860.00	1.91E-10	4.12E-06	4.69E-06	1.95E-11	1.49E-06
3853	460900.00	3789860.00	1.66E-10	3.57E-06	1.13E-05	1.69E-11	1.29E-06
3854	461400.00	3789860.00	3.31E-10	7.14E-06	3.35E-06	3.38E-11	2.58E-06
3855	461900.00	3789860.00	4.08E-10	8.79E-06	0	4.15E-11	3.17E-06
3856	462400.00	3789860.00	3.95E-10	8.51E-06	1.40E-05	4.03E-11	3.07E-06
3857	462900.00	3789860.00	2.68E-10	5.77E-06	0	2.73E-11	2.08E-06
3858	463400.00	3789860.00	1.27E-10	2.75E-06	2.97E-05	1.30E-11	9.92E-07
3859	463900.00	3789860.00	1.78E-10	3.85E-06	1.39E-05	1.82E-11	1.39E-06
3860	464400.00	3789860.00	2.04E-10	4.39E-06	1.47E-05	2.08E-11	1.59E-06
3861	464900.00	3789860.00	1.40E-10	3.02E-06	0	1.43E-11	1.09E-06
3862	465400.00	3789860.00	2.04E-10	4.39E-06	0	2.08E-11	1.59E-06
3863	465900.00	3789860.00	1.40E-10	3.02E-06	0	1.43E-11	1.09E-06
3864	466400.00	3789860.00	1.40E-10	3.02E-06	0	1.43E-11	1.09E-06
3865	466900.00	3789860.00	1.40E-10	3.02E-06	2.44E-07	1.43E-11	1.09E-06
3866	467400.00	3789860.00	1.27E-10	2.75E-06	9.54E-07	1.30E-11	9.92E-07
3867	467900.00	3789860.00	1.27E-10	2.75E-06	1.10E-06	1.30E-11	9.92E-07
3868	468400.00	3789860.00	1.40E-10	3.02E-06	1.83E-07	1.43E-11	1.09E-06
3869	468900.00	3789860.00	1.40E-10	3.02E-06	8.45E-06	1.43E-11	1.09E-06
3870	469400.00	3789860.00	1.27E-10	2.75E-06	3.37E-06	1.30E-11	9.92E-07
3871	469900.00	3789860.00	1.40E-10	3.02E-06	1.28E-05	1.43E-11	1.09E-06
3872	470400.00	3789860.00	1.15E-10	2.47E-06	1.38E-05	1.17E-11	8.92E-07
3873	470900.00	3789860.00	1.53E-10	3.30E-06	4.85E-06	1.56E-11	1.19E-06
3874	471400.00	3789860.00	7.64E-11	1.65E-06	0	7.79E-12	5.95E-07
3875	471900.00	3789860.00	8.92E-11	1.92E-06	0	9.09E-12	6.94E-07
3876	472400.00	3789860.00	1.02E-10	2.20E-06	0	1.04E-11	7.93E-07
3877	472900.00	3789860.00	1.02E-10	2.20E-06	3.96E-06	1.04E-11	7.93E-07
3878	473400.00	3789860.00	8.92E-11	1.92E-06	4.01E-06	9.09E-12	6.94E-07
3879	473900.00	3789860.00	6.37E-11	1.37E-06	5.92E-08	6.49E-12	4.96E-07
3880	474400.00	3789860.00	5.10E-11	1.10E-06	0	5.19E-12	3.97E-07
3881	474900.00	3789860.00	6.37E-11	1.37E-06	0	6.49E-12	4.96E-07
3882	475400.00	3789860.00	5.10E-11	1.10E-06	5.98E-07	5.19E-12	3.97E-07
3883	457900.00	3790360.00	4.46E-10	9.61E-06	0	4.54E-11	3.47E-06
3884	458400.00	3790360.00	3.95E-10	8.51E-06	1.40E-05	4.03E-11	3.07E-06
3885	458900.00	3790360.00	4.08E-10	8.79E-06	9.97E-06	4.15E-11	3.17E-06
3886	459400.00	3790360.00	2.55E-10	5.49E-06	0	2.60E-11	1.98E-06
3887	459900.00	3790360.00	1.66E-10	3.57E-06	0	1.69E-11	1.29E-06
3888	460400.00	3790360.00	1.53E-10	3.30E-06	1.35E-05	1.56E-11	1.19E-06
3889	460900.00	3790360.00	1.53E-10	3.30E-06	0	1.56E-11	1.19E-06
3890	461400.00	3790360.00	2.55E-10	5.49E-06	0	2.60E-11	1.98E-06
3891	461900.00	3790360.00	2.55E-10	5.49E-06	1.41E-05	2.60E-11	1.98E-06
3892	462400.00	3790360.00	2.68E-10	5.77E-06	0	2.73E-11	2.08E-06
3893	462900.00	3790360.00	1.78E-10	3.85E-06	8.54E-06	1.82E-11	1.39E-06
3894	463400.00	3790360.00	1.27E-10	2.75E-06	0	1.30E-11	9.92E-07
3895	463900.00	3790360.00	1.02E-10	2.20E-06	7.14E-06	1.04E-11	7.93E-07
3896	464400.00	3790360.00	1.02E-10	2.20E-06	0	1.04E-11	7.93E-07
3897	464900.00	3790360.00	1.15E-10	2.47E-06	0	1.17E-11	8.92E-07
3898	465400.00	3790360.00	1.27E-10	2.75E-06	0	1.30E-11	9.92E-07
3899	465900.00	3790360.00	1.15E-10	2.47E-06	1.07E-06	1.17E-11	8.92E-07
3900	466400.00	3790360.00	1.27E-10	2.75E-06	2.80E-07	1.30E-11	9.92E-07
3901	466900.00	3790360.00	1.15E-10	2.47E-06	3.13E-07	1.17E-11	8.92E-07
3902	467400.00	3790360.00	1.15E-10	2.47E-06	8.67E-07	1.17E-11	8.92E-07
3903	467900.00	3790360.00	1.27E-10	2.75E-06	9.85E-07	1.30E-11	9.92E-07
3904	468400.00	3790360.00	1.15E-10	2.47E-06	3.41E-07	1.17E-11	8.92E-07
3905	468900.00	3790360.00	1.15E-10	2.47E-06	7.92E-06	1.17E-11	8.92E-07

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3906	469400.00	3790360.00	1.27E-10	2.75E-06	8.82E-07	1.30E-11	9.92E-07
3907	469900.00	3790360.00	1.15E-10	2.47E-06	1.63E-06	1.17E-11	8.92E-07
3908	470400.00	3790360.00	8.92E-11	1.92E-06	0	9.09E-12	6.94E-07
3909	470900.00	3790360.00	1.02E-10	2.20E-06	6.03E-07	1.04E-11	7.93E-07
3910	471400.00	3790360.00	1.02E-10	2.20E-06	7.60E-06	1.04E-11	7.93E-07
3911	471900.00	3790360.00	7.64E-11	1.65E-06	1.10E-05	7.79E-12	5.95E-07
3912	472400.00	3790360.00	7.64E-11	1.65E-06	6.90E-06	7.79E-12	5.95E-07
3913	472900.00	3790360.00	8.92E-11	1.92E-06	1.94E-06	9.09E-12	6.94E-07
3914	473400.00	3790360.00	8.92E-11	1.92E-06	0	9.09E-12	6.94E-07
3915	473900.00	3790360.00	7.64E-11	1.65E-06	2.57E-06	7.79E-12	5.95E-07
3916	474400.00	3790360.00	5.10E-11	1.10E-06	1.02E-05	5.19E-12	3.97E-07
3917	474900.00	3790360.00	6.37E-11	1.37E-06	0	6.49E-12	4.96E-07
3918	475400.00	3790360.00	7.64E-11	1.65E-06	0	7.79E-12	5.95E-07
3919	466715.99	3782622.21	1.38E-07	2.97E-03	5.95E-04	1.41E-08	1.07E-03
3920	467571.64	3781541.90	-3.96E-08	0	0	-4.53E-09	0
3921	466428.29	3780272.84	-6.70E-08	0	0	-7.65E-09	0
3922	466363.70	3780497.50	-7.58E-08	0	2.43E-04	-8.65E-09	0
3923	466324.38	3780750.24	-8.12E-08	0	0	-9.27E-09	0
3924	466330.00	3780873.80	-8.45E-08	0	0	-9.65E-09	0
3925	466409.66	3780873.18	-1.04E-07	0	0	-1.19E-08	0
3926	466409.66	3780990.75	-1.04E-07	0	0	-1.19E-08	0
3927	466337.63	3780990.75	-8.48E-08	0	0	-9.68E-09	0
3928	466422.74	3781352.95	-2.91E-08	0	0	-3.32E-09	0
3929	466423.42	3781356.08	-2.86E-08	0	0	-3.27E-09	0
3930	466423.86	3781358.26	-2.83E-08	0	0	-3.23E-09	0
3931	466369.43	3781371.87	-1.80E-08	0	0	-2.06E-09	0
3932	466193.62	3780665.96	-5.95E-08	0	0	-6.80E-09	0
3933	466178.97	3780666.24	-5.78E-08	0	0	-6.60E-09	0
3934	465862.96	3781558.54	-5.48E-08	0	0	-6.26E-09	0
3935	465861.67	3781561.62	-5.76E-08	0	0	-6.58E-09	0
3936	466018.52	3781562.38	-1.10E-07	0	0	-1.26E-08	0
3937	465913.83	3781857.93	-2.75E-07	0	0	-3.14E-08	0
3938	466061.73	3782390.66	2.96E-07	6.38E-03	0	3.01E-08	2.30E-03
3939	466312.10	3782481.78	1.29E-07	2.78E-03	0	1.31E-08	1.00E-03
3940	466352.68	3782412.87	1.66E-07	3.58E-03	1.11E-04	1.69E-08	1.29E-03
3941	466392.50	3782320.99	2.44E-07	5.26E-03	2.75E-04	2.48E-08	1.90E-03
3942	466424.42	3782236.51	3.43E-07	7.40E-03	2.87E-04	3.50E-08	2.67E-03
3943	466444.56	3782173.99	4.27E-07	9.21E-03	0	4.35E-08	3.32E-03
3944	466459.40	3782113.58	4.85E-07	1.05E-02	0	4.94E-08	3.78E-03
3945	466467.88	3782060.59	4.52E-07	9.75E-03	0	4.61E-08	3.52E-03
3946	466475.29	3782005.48	3.24E-07	6.98E-03	0	3.30E-08	2.52E-03
3947	466480.94	3781947.36	-1.28E-08	0	0	-1.46E-09	0
3948	466480.94	3781881.62	-8.07E-08	0	0	-9.22E-09	0
3949	466478.99	3781832.15	-3.49E-08	0	0	-3.99E-09	0
3950	466477.68	3781785.29	2.12E-08	4.57E-04	0	2.16E-09	1.65E-04
3951	466471.39	3781727.13	-2.37E-08	0	0	-2.71E-09	0
3952	466457.29	3781657.06	-4.80E-08	0	0	-5.49E-09	0
3953	466433.48	3781560.84	-3.12E-08	0	0	-3.56E-09	0
3954	466472.66	3781560.44	-5.77E-08	0	0	-6.59E-09	0
3955	466500.13	3781693.58	-5.91E-07	0	0	-6.75E-08	0
3956	466513.94	3781862.72	3.79E-07	8.16E-03	5.63E-05	3.86E-08	2.95E-03
3957	466513.94	3782012.88	7.99E-07	1.72E-02	0	8.14E-08	6.22E-03
3958	466484.60	3782164.76	5.37E-07	1.16E-02	1.09E-04	5.48E-08	4.18E-03
3959	466441.45	3782299.38	2.68E-07	5.77E-03	2.74E-04	2.73E-08	2.08E-03
3960	466387.95	3782427.10	1.51E-07	3.26E-03	0	1.54E-08	1.18E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
3961	466353.43	3782494.71	1.21E-07	2.60E-03	3.42E-04	1.23E-08	9.40E-04
3962	466746.55	3782583.63	1.54E-07	3.32E-03	5.50E-04	1.57E-08	1.20E-03
3963	466777.11	3782545.04	1.73E-07	3.72E-03	5.62E-04	1.76E-08	1.34E-03
3964	466807.67	3782506.46	1.94E-07	4.18E-03	6.02E-04	1.98E-08	1.51E-03
3965	466838.23	3782467.88	2.21E-07	4.76E-03	6.41E-04	2.25E-08	1.72E-03
3966	466868.78	3782429.30	2.53E-07	5.46E-03	5.97E-04	2.58E-08	1.97E-03
3967	466899.34	3782390.71	2.92E-07	6.29E-03	5.30E-04	2.97E-08	2.27E-03
3968	466929.90	3782352.13	3.39E-07	7.31E-03	5.00E-04	3.45E-08	2.64E-03
3969	466960.46	3782313.55	3.98E-07	8.58E-03	5.15E-04	4.06E-08	3.10E-03
3970	466991.02	3782274.97	4.72E-07	1.02E-02	5.90E-04	4.81E-08	3.67E-03
3971	467021.58	3782236.38	5.70E-07	1.23E-02	7.15E-04	5.81E-08	4.44E-03
3972	467052.14	3782197.80	6.97E-07	1.50E-02	8.26E-04	7.11E-08	5.43E-03
3973	467082.70	3782159.22	8.72E-07	1.88E-02	6.34E-04	8.88E-08	6.78E-03
3974	467113.26	3782120.64	1.10E-06	2.36E-02	8.48E-04	1.12E-07	8.52E-03
3975	467143.82	3782082.05	1.35E-06	2.91E-02	1.80E-03	1.38E-07	1.05E-02
3976	467174.37	3782043.47	1.71E-06	3.68E-02	2.01E-03	1.74E-07	1.33E-02
3977	467204.93	3782004.89	2.29E-06	4.94E-02	2.05E-03	2.33E-07	1.78E-02
3978	467235.49	3781966.31	3.17E-06	6.83E-02	1.91E-03	3.23E-07	2.46E-02
3979	467266.05	3781927.73	4.50E-06	9.71E-02	9.60E-04	4.59E-07	3.50E-02
3980	467296.61	3781889.14	6.69E-06	1.44E-01	2.77E-03	6.82E-07	5.21E-02
3981	467327.17	3781850.56	1.05E-05	2.27E-01	3.95E-03	1.07E-06	8.19E-02
3982	467357.73	3781811.98	1.71E-05	3.69E-01	1.54E-02	1.74E-06	1.33E-01
3983	467388.29	3781773.40	2.91E-05	6.28E-01	1.92E-02	2.97E-06	2.27E-01
3984	467418.85	3781734.81	4.83E-05	1.04E+00	3.60E-02	4.92E-06	3.76E-01
3985	467449.40	3781696.23	6.33E-05	1.36E+00	3.89E-02	6.45E-06	4.93E-01
3986	467479.96	3781657.65	5.43E-05	1.17E+00	2.23E-02	5.54E-06	4.23E-01
3987	467510.52	3781619.06	3.03E-05	6.54E-01	6.17E-03	3.09E-06	2.36E-01
3988	467541.08	3781580.48	1.11E-05	2.40E-01	6.49E-03	1.14E-06	8.67E-02
3989	467538.97	3781505.64	-1.04E-05	0	0	-1.19E-06	0
3990	467506.31	3781469.38	-2.81E-05	0	0	-3.21E-06	0
3991	467473.64	3781433.12	-4.79E-05	0	0	-5.48E-06	0
3992	467440.97	3781396.86	-5.17E-05	0	0	-5.90E-06	0
3993	467408.30	3781360.61	-3.72E-05	0	0	-4.25E-06	0
3994	467375.64	3781324.35	-2.24E-05	0	0	-2.56E-06	0
3995	467342.97	3781288.09	-1.33E-05	0	0	-1.52E-06	0
3996	467310.30	3781251.83	-8.29E-06	0	0	-9.47E-07	0
3997	467277.64	3781215.57	-5.43E-06	0	0	-6.20E-07	0
3998	467244.97	3781179.31	-3.73E-06	0	0	-4.26E-07	0
3999	467212.30	3781143.05	-2.66E-06	0	0	-3.04E-07	0
4000	467179.63	3781106.79	-1.97E-06	0	0	-2.25E-07	0
4001	467146.97	3781070.53	-1.50E-06	0	0	-1.71E-07	0
4002	467114.30	3781034.28	-1.16E-06	0	0	-1.33E-07	0
4003	467081.63	3780998.02	-9.25E-07	0	0	-1.06E-07	0
4004	467048.97	3780961.76	-7.48E-07	0	0	-8.54E-08	0
4005	467016.30	3780925.50	-6.13E-07	0	0	-7.01E-08	0
4006	466983.63	3780889.24	-5.10E-07	0	0	-5.82E-08	0
4007	466950.96	3780852.98	-4.29E-07	0	0	-4.90E-08	0
4008	466918.30	3780816.72	-3.65E-07	0	0	-4.16E-08	0
4009	466885.63	3780780.46	-3.13E-07	0	0	-3.57E-08	0
4010	466852.96	3780744.21	-2.70E-07	0	0	-3.09E-08	0
4011	466820.30	3780707.95	-2.36E-07	0	0	-2.69E-08	0
4012	466787.63	3780671.69	-2.07E-07	0	0	-2.36E-08	0
4013	466754.96	3780635.43	-1.82E-07	0	0	-2.08E-08	0
4014	466722.29	3780599.17	-1.62E-07	0	0	-1.85E-08	0
4015	466689.63	3780562.91	-1.45E-07	0	0	-1.65E-08	0

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
4016	466656.96	3780526.65	-1.30E-07	0	0	-1.48E-08	0
4017	466624.29	3780490.39	-1.17E-07	0	0	-1.33E-08	0
4018	466591.63	3780454.13	-1.05E-07	0	0	-1.20E-08	0
4019	466558.96	3780417.88	-9.57E-08	0	0	-1.09E-08	0
4020	466526.29	3780381.62	-8.71E-08	0	0	-9.95E-09	0
4021	466493.62	3780345.36	-7.96E-08	0	0	-9.09E-09	0
4022	466460.96	3780309.10	-7.29E-08	0	0	-8.33E-09	0
4023	466415.37	3780317.77	-6.92E-08	0	0	-7.91E-09	0
4024	466402.45	3780362.70	-7.12E-08	0	0	-8.13E-09	0
4025	466389.54	3780407.64	-7.30E-08	0	0	-8.34E-09	0
4026	466376.62	3780452.57	-7.46E-08	0	1.53E-04	-8.52E-09	0
4027	466357.15	3780539.62	-7.74E-08	0	1.73E-04	-8.84E-09	0
4028	466350.59	3780581.75	-7.87E-08	0	6.16E-05	-8.99E-09	0
4029	466344.04	3780623.87	-7.98E-08	0	0	-9.12E-09	0
4030	466337.49	3780665.99	-8.06E-08	0	0	-9.21E-09	0
4031	466330.93	3780708.12	-8.11E-08	0	0	-9.26E-09	0
4032	466326.25	3780791.43	-8.25E-08	0	0	-9.43E-09	0
4033	466328.13	3780832.61	-8.37E-08	0	0	-9.56E-09	0
4034	466369.83	3780873.49	-9.36E-08	0	0	-1.07E-08	0
4035	466409.66	3780912.37	-1.05E-07	0	0	-1.19E-08	0
4036	466409.66	3780951.56	-1.05E-07	0	0	-1.20E-08	0
4037	466373.65	3780990.75	-9.40E-08	0	0	-1.07E-08	0
4038	466348.27	3781036.02	-8.54E-08	0	0	-9.76E-09	0
4039	466358.91	3781081.30	-8.49E-08	0	0	-9.69E-09	0
4040	466369.55	3781126.58	-8.29E-08	0	1.67E-04	-9.47E-09	0
4041	466380.18	3781171.85	-8.02E-08	0	4.22E-04	-9.16E-09	0
4042	466390.82	3781217.13	-7.69E-08	0	5.45E-04	-8.78E-09	0
4043	466401.46	3781262.40	-7.27E-08	0	5.07E-04	-8.30E-09	0
4044	466412.10	3781307.68	-4.86E-08	0	0	-5.55E-09	0
4045	466396.65	3781365.06	-2.21E-08	0	0	-2.53E-09	0
4046	466357.71	3781324.81	-3.37E-08	0	0	-3.85E-09	0
4047	466345.99	3781277.75	-4.95E-08	0	0	-5.65E-09	0
4048	466334.27	3781230.69	-6.21E-08	0	3.93E-04	-7.09E-09	0
4049	466322.55	3781183.63	-6.51E-08	0	4.32E-04	-7.44E-09	0
4050	466310.83	3781136.57	-6.79E-08	0	3.23E-04	-7.75E-09	0
4051	466299.11	3781089.51	-7.00E-08	0	5.66E-05	-7.99E-09	0
4052	466287.39	3781042.45	-7.13E-08	0	0	-8.14E-09	0
4053	466275.66	3780995.38	-7.12E-08	0	0	-8.13E-09	0
4054	466263.94	3780948.32	-7.06E-08	0	0	-8.06E-09	0
4055	466252.22	3780901.26	-6.93E-08	0	0	-7.92E-09	0
4056	466240.50	3780854.20	-6.77E-08	0	0	-7.73E-09	0
4057	466228.78	3780807.14	-6.58E-08	0	0	-7.52E-09	0
4058	466217.06	3780760.08	-6.38E-08	0	0	-7.29E-09	0
4059	466205.34	3780713.02	-6.17E-08	0	0	-7.05E-09	0
4060	466162.34	3780713.20	-5.63E-08	0	0	-6.44E-09	0
4061	466145.71	3780760.17	-5.47E-08	0	0	-6.24E-09	0
4062	466129.07	3780807.13	-5.27E-08	0	0	-6.02E-09	0
4063	466112.44	3780854.09	-5.04E-08	0	0	-5.75E-09	0
4064	466095.81	3780901.06	-4.77E-08	0	0	-5.44E-09	0
4065	466079.18	3780948.02	-4.46E-08	0	0	-5.09E-09	0
4066	466062.55	3780994.98	-4.12E-08	0	1.20E-04	-4.71E-09	0
4067	466045.91	3781041.95	-3.77E-08	0	2.04E-04	-4.31E-09	0
4068	466029.28	3781088.91	-3.40E-08	0	1.70E-04	-3.88E-09	0
4069	466012.65	3781135.87	-3.00E-08	0	1.13E-05	-3.42E-09	0
4070	465996.02	3781182.83	-2.62E-08	0	6.64E-05	-2.99E-09	0

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4071	465979.38	3781229.80	-2.30E-08	0	5.64E-05	-2.63E-09	0
4072	465962.75	3781276.76	-9.28E-09	0	0	-1.06E-09	0
4073	465946.12	3781323.72	-5.24E-10	0	0	-5.98E-11	0
4074	465929.49	3781370.69	1.27E-10	2.75E-06	0	1.30E-11	9.91E-07
4075	465912.86	3781417.65	-1.64E-09	0	0	-1.87E-10	0
4076	465896.22	3781464.61	-6.35E-09	0	0	-7.26E-10	0
4077	465879.59	3781511.58	-1.31E-08	0	0	-1.49E-09	0
4078	465900.88	3781561.81	-5.32E-08	0	0	-6.08E-09	0
4079	465940.09	3781562.00	-9.41E-08	0	0	-1.07E-08	0
4080	465979.31	3781562.19	-1.14E-07	0	0	-1.30E-08	0
4081	466003.56	3781604.60	-8.89E-08	0	0	-1.02E-08	0
4082	465988.61	3781646.82	-2.72E-07	0	0	-3.11E-08	0
4083	465973.65	3781689.04	-3.24E-07	0	0	-3.70E-08	0
4084	465958.70	3781731.27	-3.52E-07	0	0	-4.02E-08	0
4085	465943.74	3781773.49	-3.50E-07	0	0	-4.00E-08	0
4086	465928.79	3781815.71	-3.25E-07	0	0	-3.71E-08	0
4087	465926.16	3781902.32	-1.89E-07	0	0	-2.16E-08	0
4088	465938.48	3781946.72	-7.23E-08	0	0	-8.26E-09	0
4089	465950.80	3781991.11	6.56E-08	1.41E-03	0	6.68E-09	5.10E-04
4090	465963.13	3782035.51	2.03E-07	4.38E-03	0	2.07E-08	1.58E-03
4091	465975.46	3782079.90	3.18E-07	6.87E-03	0	3.25E-08	2.48E-03
4092	465987.78	3782124.29	3.99E-07	8.60E-03	3.04E-04	4.07E-08	3.11E-03
4093	466000.10	3782168.69	4.51E-07	9.72E-03	2.50E-05	4.59E-08	3.51E-03
4094	466012.43	3782213.08	4.66E-07	1.01E-02	1.71E-05	4.75E-08	3.63E-03
4095	466024.76	3782257.48	4.49E-07	9.67E-03	1.08E-04	4.57E-08	3.49E-03
4096	466037.08	3782301.87	4.08E-07	8.79E-03	0	4.16E-08	3.17E-03
4097	466049.40	3782346.27	3.55E-07	7.65E-03	6.35E-05	3.61E-08	2.76E-03
4098	466103.46	3782405.85	2.62E-07	5.64E-03	5.18E-05	2.67E-08	2.04E-03
4099	466145.19	3782421.03	2.26E-07	4.86E-03	5.03E-04	2.30E-08	1.76E-03
4100	466186.91	3782436.22	1.93E-07	4.16E-03	4.56E-04	1.97E-08	1.50E-03
4101	466228.64	3782451.41	1.64E-07	3.54E-03	4.42E-05	1.68E-08	1.28E-03
4102	466270.37	3782466.59	1.42E-07	3.07E-03	1.58E-04	1.45E-08	1.11E-03
4103	466332.39	3782447.33	1.46E-07	3.14E-03	3.61E-05	1.49E-08	1.13E-03
4104	466365.95	3782382.24	1.89E-07	4.07E-03	1.79E-04	1.92E-08	1.47E-03
4105	466379.23	3782351.62	2.15E-07	4.63E-03	2.63E-04	2.19E-08	1.67E-03
4106	466408.46	3782278.75	2.91E-07	6.27E-03	3.84E-04	2.96E-08	2.26E-03
4107	466434.49	3782205.25	3.84E-07	8.27E-03	0	3.91E-08	2.99E-03
4108	466451.98	3782143.79	4.60E-07	9.93E-03	0	4.69E-08	3.58E-03
4109	466463.64	3782087.08	4.78E-07	1.03E-02	0	4.87E-08	3.72E-03
4110	466471.58	3782033.04	3.95E-07	8.52E-03	0	4.03E-08	3.08E-03
4111	466478.11	3781976.42	1.33E-07	2.87E-03	0	1.36E-08	1.04E-03
4112	466480.94	3781914.49	-6.97E-08	0	0	-7.96E-09	0
4113	466474.54	3781756.21	-6.00E-09	0	0	-6.86E-10	0
4114	466464.34	3781692.09	-3.76E-08	0	0	-4.29E-09	0
4115	466445.39	3781608.95	-4.55E-08	0	0	-5.19E-09	0
4116	466481.82	3781604.82	-1.74E-07	0	0	-1.98E-08	0
4117	466490.97	3781649.20	-4.33E-07	0	0	-4.95E-08	0
4118	466503.58	3781735.87	-6.25E-07	0	0	-7.14E-08	0
4119	466507.04	3781778.15	-3.90E-07	0	0	-4.45E-08	0
4120	466510.49	3781820.44	-3.34E-08	0	0	-3.81E-09	0
4121	466513.94	3781900.26	6.94E-07	1.50E-02	0	7.08E-08	5.40E-03
4122	466513.94	3781937.80	8.76E-07	1.89E-02	0	8.93E-08	6.82E-03
4123	466513.94	3781975.34	8.97E-07	1.93E-02	4.24E-04	9.14E-08	6.98E-03
4124	466506.60	3782050.85	8.36E-07	1.80E-02	0	8.52E-08	6.50E-03
4125	466499.27	3782088.82	7.62E-07	1.64E-02	2.43E-04	7.76E-08	5.93E-03

REC	X	Y	30yr Cancer Risk Sum	Residential Chronic Hazard Index	Acute Hazard Index	Worker Cancer Risk Sum	Worker Max Chronic Hazard
4126	466491.93	3782126.79	6.53E-07	1.41E-02	2.41E-04	6.65E-08	5.08E-03
4127	466470.22	3782209.63	4.37E-07	9.42E-03	6.43E-04	4.45E-08	3.40E-03
4128	466455.83	3782254.51	3.43E-07	7.39E-03	4.53E-04	3.49E-08	2.67E-03
4129	466423.62	3782341.95	2.17E-07	4.68E-03	2.41E-04	2.21E-08	1.69E-03
4130	466405.78	3782384.53	1.79E-07	3.86E-03	7.22E-05	1.82E-08	1.39E-03
4131	466370.69	3782460.91	1.34E-07	2.90E-03	9.44E-05	1.37E-08	1.05E-03
4132	466398.75	3782510.65	1.18E-07	2.54E-03	4.24E-04	1.20E-08	9.18E-04
4133	466444.07	3782526.58	1.16E-07	2.50E-03	1.09E-04	1.18E-08	9.04E-04
4134	466489.39	3782542.52	1.15E-07	2.49E-03	0	1.17E-08	8.97E-04
4135	466534.71	3782558.46	1.16E-07	2.49E-03	4.68E-04	1.18E-08	9.00E-04
4136	466580.03	3782574.40	1.19E-07	2.56E-03	3.54E-04	1.21E-08	9.23E-04
4137	466625.35	3782590.33	1.25E-07	2.69E-03	1.94E-04	1.27E-08	9.70E-04
4138	466670.67	3782606.27	1.32E-07	2.85E-03	2.06E-04	1.35E-08	1.03E-03

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1	464902.6	3779643	3.16E-08	0.00068113	3.46E-05	0.00024589	3.22E-09
2	465077.3	3779643	2.43E-08	0.00052486	2.02E-05	0.00018948	2.48E-09
3	465252.1	3779643	1.34E-08	0.00028783	2.79E-05	0.00010391	1.36E-09
4	465426.8	3779643	-1.79E-09	0	0	0	-2.04E-10
5	465601.6	3779643	-1.89E-08	0	0	0	-2.16E-09
6	465776.3	3779643	-4.09E-08	0	1.19E-05	0	-4.67E-09
7	465951	3779643	-6.85E-08	0	0	0	-7.82E-09
8	466125.8	3779643	-9.98E-08	0	0	0	-1.14E-08
9	466300.5	3779643	-1.34E-07	0	0	0	-1.53E-08
10	466475.3	3779643	-1.61E-07	0	0	0	-1.84E-08
11	466650	3779643	-1.87E-07	0	0	0	-2.14E-08
12	466824.7	3779643	-2.01E-07	0	0	0	-2.29E-08
13	466999.5	3779643	-2.04E-07	0	2.31E-05	0	-2.33E-08
14	467174.2	3779643	-1.98E-07	0	0	0	-2.26E-08
15	467349	3779643	-1.86E-07	0	0	0	-2.12E-08
16	467523.7	3779643	-1.70E-07	0	0	0	-1.94E-08
17	467698.4	3779643	-1.53E-07	0	3.10E-05	0	-1.75E-08
18	467873.2	3779643	-1.36E-07	0	0	0	-1.56E-08
19	468047.9	3779643	-1.21E-07	0	0	0	-1.38E-08
20	468222.7	3779643	-1.06E-07	0	0	0	-1.21E-08
21	468397.4	3779643	-9.33E-08	0	0	0	-1.07E-08
22	464902.6	3779826	5.01E-08	0.0010805	0.00022893	0.00039006	5.11E-09
23	465077.3	3779826	4.37E-08	0.00094177	4.90E-05	0.00033999	4.45E-09
24	465252.1	3779826	3.21E-08	0.00069267	3.27E-05	0.00025006	3.27E-09
25	465426.8	3779826	1.42E-08	0.00030569	4.56E-05	0.00011036	1.45E-09
26	465601.6	3779826	-9.25E-09	0	0	0	-1.06E-09
27	465776.3	3779826	-4.05E-08	0	0	0	-4.62E-09
28	465951	3779826	-8.00E-08	0	0	0	-9.14E-09
29	466125.8	3779826	-1.27E-07	0	0	0	-1.45E-08
30	466300.5	3779826	-1.81E-07	0	0	0	-2.06E-08
31	466475.3	3779826	-2.25E-07	0	0	0	-2.57E-08
32	466650	3779826	-2.65E-07	0	0	0	-3.03E-08
33	466824.7	3779826	-2.84E-07	0	0	0	-3.25E-08
34	466999.5	3779826	-2.84E-07	0	2.48E-05	0	-3.25E-08
35	467174.2	3779826	-2.70E-07	0	0	0	-3.09E-08
36	467349	3779826	-2.47E-07	0	0	0	-2.82E-08
37	467523.7	3779826	-2.20E-07	0	0	0	-2.51E-08
38	467698.4	3779826	-1.93E-07	0	0	0	-2.20E-08
39	467873.2	3779826	-1.68E-07	0	0	0	-1.92E-08
40	468047.9	3779826	-1.45E-07	0	0	0	-1.65E-08
41	468222.7	3779826	-1.25E-07	0	0	0	-1.43E-08
42	468397.4	3779826	-1.09E-07	0	0	0	-1.24E-08
43	464902.6	3780009	7.49E-08	0.0016144	0.00020424	0.00058281	7.63E-09
44	465077.3	3780009	7.28E-08	0.0015691	0.0003242	0.00056645	7.42E-09
45	465252.1	3780009	6.40E-08	0.001379	5.21E-05	0.00049784	6.52E-09
46	465426.8	3780009	4.58E-08	0.00098654	0.00013263	0.00035615	4.66E-09
47	465601.6	3780009	1.27E-08	0.00027355	0	9.88E-05	1.29E-09
48	465776.3	3780009	-3.06E-08	0	9.76E-07	0	-3.50E-09
49	465951	3780009	-8.94E-08	0	0	0	-1.02E-08
50	466125.8	3780009	-1.65E-07	0	0	0	-1.89E-08
51	466300.5	3780009	-2.52E-07	0	0	0	-2.88E-08
52	466475.3	3780009	-3.37E-07	0	0	0	-3.85E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
53	466650	3780009	-3.97E-07	0	0	0	-4.53E-08
54	466824.7	3780009	-4.23E-07	0	0	0	-4.83E-08
55	466999.5	3780009	-4.14E-07	0	0	0	-4.73E-08
56	467174.2	3780009	-3.81E-07	0	0	0	-4.35E-08
57	467349	3780009	-3.36E-07	0	0	0	-3.84E-08
58	467523.7	3780009	-2.89E-07	0	0	0	-3.30E-08
59	467698.4	3780009	-2.45E-07	0	0	0	-2.80E-08
60	467873.2	3780009	-2.07E-07	0	0	0	-2.36E-08
61	468047.9	3780009	-1.75E-07	0	0	0	-2.00E-08
62	468222.7	3780009	-1.49E-07	0	0	0	-1.70E-08
63	468397.4	3780009	-1.27E-07	0	0	0	-1.45E-08
64	464902.6	3780191	1.07E-07	0.0023167	0	0.00083634	1.10E-08
65	465077.3	3780191	1.14E-07	0.0024625	0.00036076	0.00088899	1.16E-08
66	465252.1	3780191	1.13E-07	0.0024381	0.00041902	0.00088016	1.15E-08
67	465426.8	3780191	1.00E-07	0.0021579	5.33E-05	0.00077903	1.02E-08
68	465601.6	3780191	6.83E-08	0.0014716	0.00021429	0.00053125	6.96E-09
69	465776.3	3780191	5.13E-09	0.00011069	0.00058652	4.00E-05	5.23E-10
70	465951	3780191	-8.54E-08	0	0	0	-9.75E-09
71	466125.8	3780191	-2.12E-07	0	0	0	-2.43E-08
72	466300.5	3780191	-3.66E-07	0	0	0	-4.18E-08
73	466475.3	3780191	-5.25E-07	0	0	0	-5.99E-08
74	466650	3780191	-6.36E-07	0	0	0	-7.27E-08
75	466824.7	3780191	-6.72E-07	0	0	0	-7.67E-08
76	466999.5	3780191	-6.35E-07	0	0	0	-7.25E-08
77	467174.2	3780191	-5.57E-07	0	0	0	-6.36E-08
78	467349	3780191	-4.67E-07	0	0	0	-5.33E-08
79	467523.7	3780191	-3.84E-07	0	0	0	-4.38E-08
80	467698.4	3780191	-3.13E-07	0	0	0	-3.58E-08
81	467873.2	3780191	-2.56E-07	0	0	0	-2.93E-08
82	468047.9	3780191	-2.13E-07	0	0	0	-2.43E-08
83	468222.7	3780191	-1.77E-07	0	0	0	-2.02E-08
84	468397.4	3780191	-1.49E-07	0	0	0	-1.70E-08
85	464902.6	3780374	1.48E-07	0.003192	0.00015913	0.0011523	1.51E-08
86	465077.3	3780374	1.69E-07	0.0036353	3.35E-05	0.0013124	1.72E-08
87	465252.1	3780374	1.86E-07	0.0040135	0.00037184	0.0014489	1.90E-08
88	465426.8	3780374	1.92E-07	0.004134	0.00046412	0.0014924	1.95E-08
89	465601.6	3780374	1.72E-07	0.0037042	0.00041485	0.0013372	1.75E-08
90	465776.3	3780374	1.04E-07	0.0022354	0.0004795	0.00080699	1.06E-08
91	465951	3780374	-3.93E-08	0	0.00038801	0	-4.49E-09
92	466125.8	3780374	-2.58E-07	0	0	0	-2.95E-08
93	466300.5	3780374	-5.56E-07	0	0	0	-6.35E-08
94	466650	3780374	-1.13E-06	0	0	0	-1.29E-07
95	466824.7	3780374	-1.17E-06	0	0	0	-1.34E-07
96	466999.5	3780374	-1.04E-06	0	0	0	-1.19E-07
97	467174.2	3780374	-8.47E-07	0	0	0	-9.68E-08
98	467349	3780374	-6.64E-07	0	0	0	-7.58E-08
99	467523.7	3780374	-5.15E-07	0	0	0	-5.89E-08
100	467698.4	3780374	-4.04E-07	0	0	0	-4.61E-08
101	467873.2	3780374	-3.22E-07	0	0	0	-3.67E-08
102	468047.9	3780374	-2.60E-07	0	0	0	-2.96E-08
103	468222.7	3780374	-2.12E-07	0	0	0	-2.42E-08
104	468397.4	3780374	-1.75E-07	0	0	0	-2.00E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
105	464902.6	3780557	1.95E-07	0.0042046	0.0002167	0.0015179	1.99E-08
106	465077.3	3780557	2.38E-07	0.0051203	0.00023883	0.0018485	2.42E-08
107	465252.1	3780557	2.87E-07	0.0061961	0.00022283	0.0022368	2.93E-08
108	465426.8	3780557	3.36E-07	0.007237	0.00096692	0.0026126	3.42E-08
109	465601.6	3780557	3.62E-07	0.0078075	0.00016049	0.0028186	3.69E-08
110	465776.3	3780557	3.26E-07	0.0070319	0.00045766	0.0025386	3.32E-08
111	465951	3780557	1.51E-07	0.0032475	0.0013139	0.0011724	1.54E-08
112	466125.8	3780557	-2.41E-07	0	0	0	-2.76E-08
113	466300.5	3780557	-8.76E-07	0	0	0	-1.00E-07
114	466824.7	3780557	-2.34E-06	0	0	0	-2.67E-07
115	466999.5	3780557	-1.85E-06	0	0	0	-2.12E-07
116	467174.2	3780557	-1.35E-06	0	0	0	-1.54E-07
117	467349	3780557	-9.66E-07	0	0	0	-1.10E-07
118	467523.7	3780557	-7.06E-07	0	0	0	-8.06E-08
119	467698.4	3780557	-5.29E-07	0	0	0	-6.04E-08
120	467873.2	3780557	-4.05E-07	0	0	0	-4.62E-08
121	468047.9	3780557	-3.16E-07	0	0	0	-3.60E-08
122	468222.7	3780557	-2.50E-07	0	0	0	-2.86E-08
123	468397.4	3780557	-2.02E-07	0	0	0	-2.30E-08
124	464902.6	3780739	2.47E-07	0.0053255	0.00052995	0.0019225	2.52E-08
125	465077.3	3780739	3.18E-07	0.0068564	0.00039431	0.0024752	3.24E-08
126	465252.1	3780739	4.15E-07	0.0089566	0.00050258	0.0032334	4.23E-08
127	465426.8	3780739	5.43E-07	0.011716	0.00054533	0.0042297	5.54E-08
128	465601.6	3780739	6.92E-07	0.014915	0.0019693	0.0053846	7.05E-08
129	465776.3	3780739	8.05E-07	0.01735	0.0013482	0.0062636	8.20E-08
130	465951	3780739	7.24E-07	0.015604	0.0016609	0.0056333	7.38E-08
131	466125.8	3780739	1.03E-07	0.0022282	0	0.00080441	1.05E-08
132	466300.5	3780739	-1.26E-06	0	0	0	-1.44E-07
133	466999.5	3780739	-3.69E-06	0	0	0	-4.21E-07
134	467174.2	3780739	-2.25E-06	0	0	0	-2.57E-07
135	467349	3780739	-1.44E-06	0	0	0	-1.65E-07
136	467523.7	3780739	-9.71E-07	0	0	0	-1.11E-07
137	467698.4	3780739	-6.82E-07	0	0	0	-7.79E-08
138	467873.2	3780739	-4.96E-07	0	0	0	-5.66E-08
139	468047.9	3780739	-3.71E-07	0	0	0	-4.24E-08
140	468222.7	3780739	-2.85E-07	0	0	0	-3.26E-08
141	468397.4	3780739	-2.24E-07	0	0	0	-2.56E-08
142	464902.6	3780922	3.09E-07	0.0066663	8.65E-05	0.0024066	3.15E-08
143	465077.3	3780922	4.10E-07	0.0088286	0.0005268	0.0031872	4.17E-08
144	465252.1	3780922	5.69E-07	0.012268	0.00087101	0.0044288	5.80E-08
145	465426.8	3780922	8.07E-07	0.017392	0.00036155	0.0062788	8.22E-08
146	465601.6	3780922	1.20E-06	0.025843	0.00061061	0.0093297	1.22E-07
147	465776.3	3780922	1.77E-06	0.038073	0.0036792	0.013745	1.80E-07
148	465951	3780922	2.29E-06	0.049411	0.0036786	0.017838	2.34E-07
149	466300.5	3780922	-8.35E-07	0	0	0	-9.54E-08
150	467174.2	3780922	-3.63E-06	0	0	0	-4.14E-07
151	467349	3780922	-1.97E-06	0	0	0	-2.25E-07
152	467523.7	3780922	-1.20E-06	0	0	0	-1.37E-07
153	467698.4	3780922	-7.87E-07	0	0	0	-8.99E-08
154	467873.2	3780922	-5.46E-07	0	0	0	-6.23E-08
155	468047.9	3780922	-3.94E-07	0	0	0	-4.50E-08
156	468222.7	3780922	-2.95E-07	0	0	0	-3.37E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
157	468397.4	3780922	-2.27E-07	0	0	0	-2.59E-08
158	464902.6	3781105	3.53E-07	0.0076051	0	0.0027455	3.60E-08
159	465077.3	3781105	4.89E-07	0.010539	0	0.0038048	4.98E-08
160	465252.1	3781105	7.08E-07	0.015254	0	0.0055069	7.21E-08
161	465426.8	3781105	1.10E-06	0.023748	0.0010378	0.0085733	1.12E-07
162	465601.6	3781105	1.85E-06	0.039921	0.0030589	0.014412	1.89E-07
163	465776.3	3781105	3.46E-06	0.074594	0.002024	0.026929	3.53E-07
164	465951	3781105	6.83E-06	0.14718	0.011076	0.053132	6.96E-07
165	467349	3781105	-1.74E-06	0	0	0	-1.98E-07
166	467523.7	3781105	-1.04E-06	0	0	0	-1.19E-07
167	467698.4	3781105	-6.80E-07	0	0	0	-7.77E-08
168	467873.2	3781105	-4.70E-07	0	0	0	-5.37E-08
169	468047.9	3781105	-3.40E-07	0	0	0	-3.88E-08
170	468222.7	3781105	-2.54E-07	0	0	0	-2.90E-08
171	468397.4	3781105	-1.96E-07	0	0	0	-2.23E-08
172	464902.6	3781287	1.40E-07	0.0030203	0	0.0010904	1.43E-08
173	465077.3	3781287	3.35E-07	0.0072255	0.00021494	0.0026085	3.42E-08
174	465252.1	3781287	6.06E-07	0.013059	0.00063334	0.0047144	6.17E-08
175	465426.8	3781287	1.21E-06	0.02611	0.0014385	0.0094261	1.23E-07
176	465601.6	3781287	2.08E-06	0.044851	0.0025355	0.016192	2.12E-07
177	465776.3	3781287	5.03E-06	0.10849	0.0044753	0.039167	5.13E-07
178	465951	3781287	1.75E-05	0.37759	0.020564	0.13631	1.79E-06
179	467349	3781287	-9.89E-07	0	0	0	-1.13E-07
180	467523.7	3781287	-6.42E-07	0	0	0	-7.33E-08
181	467698.4	3781287	-4.42E-07	0	0	0	-5.05E-08
182	467873.2	3781287	-3.19E-07	0	0	0	-3.64E-08
183	468047.9	3781287	-2.39E-07	0	0	0	-2.72E-08
184	468222.7	3781287	-1.83E-07	0	0	0	-2.10E-08
185	468397.4	3781287	-1.45E-07	0	0	0	-1.65E-08
186	464902.6	3781470	-1.74E-07	0	0	0	-1.98E-08
187	465077.3	3781470	-8.86E-08	0	0	0	-1.01E-08
188	465252.1	3781470	1.12E-07	0.0024081	0	0.00086936	1.14E-08
189	465426.8	3781470	5.91E-07	0.012736	0.00026764	0.0045976	6.02E-08
190	465601.6	3781470	1.56E-06	0.033712	0.00092844	0.01217	1.59E-07
191	465776.3	3781470	4.45E-06	0.095997	0.0037812	0.034656	4.54E-07
192	467523.7	3781470	-4.04E-07	0	0	0	-4.61E-08
193	467698.4	3781470	-2.90E-07	0	0	0	-3.31E-08
194	467873.2	3781470	-2.16E-07	0	0	0	-2.47E-08
195	468047.9	3781470	-1.66E-07	0	0	0	-1.89E-08
196	468222.7	3781470	-1.31E-07	0	0	0	-1.49E-08
197	468397.4	3781470	-1.05E-07	0	0	0	-1.20E-08
198	464902.6	3781653	-1.08E-07	0	3.06E-05	0	-1.23E-08
199	465077.3	3781653	-2.18E-08	0	0.00016521	0	-2.49E-09
200	465252.1	3781653	2.22E-07	0.0047811	0.00022025	0.001726	2.26E-08
201	465426.8	3781653	6.64E-07	0.014312	0.0011257	0.0051667	6.77E-08
202	465601.6	3781653	1.42E-06	0.030528	0.0016782	0.011021	1.44E-07
203	465776.3	3781653	2.85E-06	0.061536	0.0016598	0.022215	2.91E-07
204	465951	3781653	5.19E-06	0.11191	0.004527	0.040402	5.29E-07
205	466475.3	3781653	2.58E-06	0.055722	0.0002621	0.020116	2.63E-07
206	467523.7	3781653	-2.87E-07	0	0	0	-3.28E-08
207	467698.4	3781653	-2.20E-07	0	0	0	-2.51E-08
208	467873.2	3781653	-1.67E-07	0	0	0	-1.91E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
209	468047.9	3781653	-1.31E-07	0	0	0	-1.50E-08
210	468222.7	3781653	-1.05E-07	0	0	0	-1.20E-08
211	468397.4	3781653	-8.50E-08	0	0	0	-9.71E-09
212	464902.6	3781835	4.67E-07	0.010067	0.00055968	0.0036342	4.76E-08
213	465077.3	3781835	6.30E-07	0.01359	0.00077822	0.004906	6.42E-08
214	465252.1	3781835	6.88E-07	0.014828	0.00094202	0.0053529	7.01E-08
215	465426.8	3781835	7.98E-07	0.017203	0.00115	0.0062104	8.13E-08
216	465601.6	3781835	1.10E-06	0.023785	0.0016874	0.0085866	1.12E-07
217	465776.3	3781835	1.70E-06	0.036596	0.0022418	0.013211	1.73E-07
218	467349	3781835	-1.97E-07	0	0	0	-2.25E-08
219	467523.7	3781835	-1.82E-07	0	0	0	-2.08E-08
220	467698.4	3781835	-1.50E-07	0	0	0	-1.72E-08
221	467873.2	3781835	-1.19E-07	0	0	0	-1.36E-08
222	468047.9	3781835	-1.06E-07	0	0	0	-1.21E-08
223	468222.7	3781835	-8.99E-08	0	0	0	-1.03E-08
224	468397.4	3781835	-7.41E-08	0	0	0	-8.46E-09
225	464902.6	3782018	4.23E-07	0.0091176	0.00077042	0.0032915	4.31E-08
226	465077.3	3782018	4.32E-07	0.0093065	0.0011226	0.0033597	4.40E-08
227	465252.1	3782018	4.60E-07	0.0099063	0.0010902	0.0035763	4.68E-08
228	465426.8	3782018	5.62E-07	0.012107	0.0016598	0.0043706	5.72E-08
229	465601.6	3782018	7.29E-07	0.015709	0.0020038	0.0056712	7.43E-08
230	465776.3	3782018	9.60E-07	0.020703	0.0015057	0.007474	9.79E-08
231	465951	3782018	1.10E-06	0.023676	0.0026392	0.0085474	1.12E-07
232	466475.3	3782018	8.94E-07	0.019282	0	0.0069611	9.12E-08
233	467349	3782018	-8.11E-08	0	0	0	-9.27E-09
234	467523.7	3782018	-8.49E-08	0	0	0	-9.69E-09
235	467698.4	3782018	-8.59E-08	0	0	0	-9.81E-09
236	467873.2	3782018	-7.98E-08	0	0	0	-9.11E-09
237	468047.9	3782018	-7.77E-08	0	0	0	-8.88E-09
238	468222.7	3782018	-7.27E-08	0	0	0	-8.30E-09
239	468397.4	3782018	-6.45E-08	0	0	0	-7.37E-09
240	464902.6	3782201	2.55E-07	0.0054875	0.0008819	0.001981	2.59E-08
241	465077.3	3782201	2.75E-07	0.0059341	0.00075494	0.0021423	2.81E-08
242	465252.1	3782201	3.24E-07	0.006983	0.0012859	0.0025209	3.30E-08
243	465426.8	3782201	3.94E-07	0.0085037	0.0014007	0.0030699	4.02E-08
244	465601.6	3782201	4.80E-07	0.010342	0.0018338	0.0037336	4.89E-08
245	465776.3	3782201	5.52E-07	0.011903	0.0016085	0.0042971	5.63E-08
246	465951	3782201	6.04E-07	0.013011	0.0012629	0.0046972	6.15E-08
247	467174.2	3782201	9.25E-08	0.0019934	0	0.00071964	9.42E-09
248	467349	3782201	2.50E-09	5.38E-05	0	1.94E-05	2.54E-10
249	467523.7	3782201	-1.29E-08	0	0	0	-1.47E-09
250	467698.4	3782201	-1.43E-08	0	0	0	-1.63E-09
251	467873.2	3782201	-6.29E-09	0	0	0	-7.18E-10
252	468047.9	3782201	-3.62E-08	0	0	0	-4.13E-09
253	468222.7	3782201	-4.72E-08	0	0	0	-5.39E-09
254	468397.4	3782201	-4.88E-08	0	0	0	-5.58E-09
255	464902.6	3782383	1.78E-07	0.0038275	0.00086746	0.0013818	1.81E-08
256	465077.3	3782383	2.05E-07	0.0044092	0.00099759	0.0015918	2.08E-08
257	465252.1	3782383	2.35E-07	0.0050728	0.0011969	0.0018313	2.40E-08
258	465426.8	3782383	2.84E-07	0.0061121	0.0016803	0.0022065	2.89E-08
259	465601.6	3782383	3.10E-07	0.0066781	0.0012975	0.0024109	3.16E-08
260	465776.3	3782383	3.32E-07	0.0071566	0.0011517	0.0025836	3.38E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
261	465951	3782383	3.60E-07	0.0077542	0.0013595	0.0027993	3.67E-08
262	466999.5	3782383	1.60E-07	0.0034411	0	0.0012423	1.63E-08
263	467174.2	3782383	1.15E-07	0.0024757	0	0.00089375	1.17E-08
264	467349	3782383	5.61E-08	0.0012085	0	0.00043626	5.71E-09
265	467523.7	3782383	3.71E-08	0.00079951	0	0.00028863	3.78E-09
266	467698.4	3782383	1.99E-08	0.00042928	0	0.00015497	2.03E-09
267	467873.2	3782383	1.21E-08	0.00026064	0	9.41E-05	1.23E-09
268	468047.9	3782383	-1.18E-08	0	0	0	-1.34E-09
269	468222.7	3782383	-2.96E-08	0	0	0	-3.38E-09
270	468397.4	3782383	-3.46E-08	0	0	0	-3.95E-09
271	464902.6	3782566	1.34E-07	0.002889	0.00076474	0.001043	1.37E-08
272	465077.3	3782566	1.50E-07	0.00324	0.00091005	0.0011697	1.53E-08
273	465252.1	3782566	1.84E-07	0.0039572	0.0014068	0.0014286	1.87E-08
274	465426.8	3782566	1.99E-07	0.0042953	0.00097687	0.0015506	2.03E-08
275	465601.6	3782566	2.04E-07	0.004398	0.0010495	0.0015877	2.08E-08
276	465776.3	3782566	2.25E-07	0.0048454	0.00085485	0.0017492	2.29E-08
277	465951	3782566	2.36E-07	0.0050956	0.0006529	0.0018395	2.41E-08
278	466125.8	3782566	2.38E-07	0.0051316	0.00081682	0.0018525	2.43E-08
279	466300.5	3782566	2.12E-07	0.0045625	0.00073618	0.0016471	2.16E-08
280	466475.3	3782566	1.96E-07	0.0042203	3.85E-06	0.0015236	2.00E-08
281	466824.7	3782566	1.30E-07	0.0028031	0	0.0010119	1.33E-08
282	466999.5	3782566	1.36E-07	0.0029399	0	0.0010613	1.39E-08
283	467174.2	3782566	1.09E-07	0.002359	0	0.00085161	1.12E-08
284	467349	3782566	8.16E-08	0.0017591	0	0.00063506	8.32E-09
285	467523.7	3782566	5.54E-08	0.0011934	0	0.00043081	5.64E-09
286	467698.4	3782566	3.70E-08	0.00079676	0	0.00028764	3.77E-09
287	467873.2	3782566	2.16E-08	0.00046581	0	0.00016816	2.20E-09
288	468047.9	3782566	7.40E-09	0.00015957	0	5.76E-05	7.54E-10
289	468222.7	3782566	-8.26E-09	0	0	0	-9.44E-10
290	468397.4	3782566	-1.96E-08	0	0	0	-2.24E-09
291	464902.6	3782749	1.01E-07	0.002167	0.00066637	0.0007823	1.02E-08
292	465077.3	3782749	1.23E-07	0.0026608	0.0010448	0.00096058	1.26E-08
293	465252.1	3782749	1.39E-07	0.002997	0.0010174	0.0010819	1.42E-08
294	465426.8	3782749	1.37E-07	0.002944	0.0008268	0.0010628	1.39E-08
295	465601.6	3782749	1.48E-07	0.0031868	0.00088857	0.0011504	1.51E-08
296	465776.3	3782749	1.64E-07	0.0035358	0.00084951	0.0012765	1.67E-08
297	465951	3782749	1.64E-07	0.0035312	0.00017426	0.0012748	1.67E-08
298	466125.8	3782749	1.65E-07	0.0035592	0.0011074	0.0012849	1.68E-08
299	466300.5	3782749	1.60E-07	0.0034518	0.00021911	0.0012461	1.63E-08
300	466475.3	3782749	1.39E-07	0.0030006	5.11E-05	0.0010832	1.42E-08
301	466650	3782749	1.07E-07	0.0023164	0	0.00083624	1.10E-08
302	466824.7	3782749	9.16E-08	0.0019753	0	0.00071309	9.34E-09
303	466999.5	3782749	8.64E-08	0.0018621	0	0.00067224	8.80E-09
304	467174.2	3782749	8.06E-08	0.001738	0	0.00062743	8.22E-09
305	467349	3782749	5.96E-08	0.001284	0	0.00046353	6.07E-09
306	467523.7	3782749	4.61E-08	0.00099341	0	0.00035863	4.70E-09
307	467698.4	3782749	4.09E-08	0.00088163	0	0.00031827	4.17E-09
308	467873.2	3782749	3.41E-08	0.00073469	0	0.00026523	3.47E-09
309	468047.9	3782749	2.06E-08	0.00044411	0	0.00016033	2.10E-09
310	468222.7	3782749	8.03E-09	0.00017303	0	6.25E-05	8.18E-10
311	468397.4	3782749	1.68E-08	0.00036254	0	0.00013088	1.71E-09
312	464902.6	3782931	8.66E-08	0.0018668	0.00068088	0.00067393	8.83E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
313	465077.3	3782931	9.95E-08	0.0021456	0.00069791	0.00077457	1.01E-08
314	465252.1	3782931	9.71E-08	0.0020942	0.00077042	0.00075603	9.90E-09
315	465426.8	3782931	1.01E-07	0.0021774	0.00083824	0.00078607	1.03E-08
316	465601.6	3782931	1.04E-07	0.0022475	0.00033715	0.00081135	1.06E-08
317	465776.3	3782931	1.10E-07	0.0023749	0.000858	0.00085736	1.12E-08
318	465951	3782931	1.21E-07	0.0026092	1.55E-05	0.00094193	1.23E-08
319	466125.8	3782931	1.18E-07	0.0025518	0.00092474	0.00092121	1.21E-08
320	466300.5	3782931	1.06E-07	0.0022788	0.00051595	0.00082266	1.08E-08
321	466475.3	3782931	1.01E-07	0.0021799	0.00041744	0.00078696	1.03E-08
322	466650	3782931	7.99E-08	0.0017234	0	0.00062217	8.15E-09
323	466824.7	3782931	6.53E-08	0.0014079	0.00030749	0.00050825	6.66E-09
324	466999.5	3782931	5.27E-08	0.0011365	0	0.00041029	5.37E-09
325	467174.2	3782931	4.68E-08	0.0010085	0.00021907	0.00036408	4.77E-09
326	467349	3782931	4.77E-08	0.0010275	3.02E-05	0.00037092	4.86E-09
327	467523.7	3782931	3.89E-08	0.00083906	0	0.00030291	3.97E-09
328	467698.4	3782931	3.12E-08	0.00067344	0	0.00024312	3.18E-09
329	467873.2	3782931	2.21E-08	0.00047569	0	0.00017173	2.25E-09
330	468047.9	3782931	2.23E-08	0.00048119	0	0.00017371	2.27E-09
331	468222.7	3782931	2.08E-08	0.00044878	0	0.00016201	2.12E-09
332	468397.4	3782931	1.35E-08	0.00029113	0	0.0001051	1.38E-09
333	464902.6	3783114	7.32E-08	0.001579	0.00062198	0.00057002	7.46E-09
334	465077.3	3783114	6.92E-08	0.0014911	0.00080807	0.00053829	7.05E-09
335	465252.1	3783114	6.82E-08	0.0014694	0.00073147	0.00053046	6.95E-09
336	465426.8	3783114	7.54E-08	0.0016265	0.00075047	0.00058717	7.69E-09
337	465601.6	3783114	7.96E-08	0.001716	0.00023658	0.0006195	8.11E-09
338	465776.3	3783114	8.39E-08	0.0018097	0.00096031	0.00065331	8.56E-09
339	465951	3783114	8.37E-08	0.0018042	0.00062022	0.00065132	8.53E-09
340	466125.8	3783114	8.35E-08	0.0018006	0.00068916	0.00065003	8.51E-09
341	466300.5	3783114	8.60E-08	0.0018542	0.00038397	0.00066937	8.77E-09
342	466475.3	3783114	7.94E-08	0.0017113	0.0005443	0.00061781	8.09E-09
343	466650	3783114	6.12E-08	0.0013191	0	0.00047622	6.24E-09
344	466824.7	3783114	5.21E-08	0.0011239	0	0.00040573	5.31E-09
345	466999.5	3783114	4.60E-08	0.00099149	0	0.00035794	4.69E-09
346	467174.2	3783114	3.99E-08	0.00085938	0	0.00031024	4.06E-09
347	467349	3783114	4.09E-08	0.00088135	0.00010255	0.00031818	4.17E-09
348	467523.7	3783114	3.40E-08	0.00073249	0	0.00026444	3.46E-09
349	467698.4	3783114	2.44E-08	0.00052568	0	0.00018977	2.49E-09
350	467873.2	3783114	2.31E-08	0.00049821	0	0.00017986	2.36E-09
351	468047.9	3783114	2.07E-08	0.00044603	0	0.00016102	2.11E-09
352	468222.7	3783114	2.10E-08	0.0004518	0	0.0001631	2.14E-09
353	468397.4	3783114	2.00E-08	0.00043065	0	0.00015547	2.04E-09
354	464902.6	3783297	5.32E-08	0.0011475	0.0008546	0.00041425	5.42E-09
355	465077.3	3783297	4.74E-08	0.0010217	0.00055967	0.00036884	4.83E-09
356	465252.1	3783297	5.40E-08	0.0011637	0.00055559	0.0004201	5.50E-09
357	465426.8	3783297	6.30E-08	0.0013576	0.00060148	0.0004901	6.42E-09
358	465601.6	3783297	7.03E-08	0.0015155	0.00045336	0.00054712	7.16E-09
359	465776.3	3783297	6.47E-08	0.0013947	0.00058787	0.00050349	6.59E-09
360	465951	3783297	5.87E-08	0.001265	0.00075661	0.00045669	5.98E-09
361	466125.8	3783297	7.05E-08	0.0015188	0.00057878	0.0005483	7.18E-09
362	466300.5	3783297	6.88E-08	0.0014823	0.00049819	0.00053512	7.01E-09
363	466475.3	3783297	6.47E-08	0.0013958	0.00054992	0.00050389	6.60E-09
364	466650	3783297	5.16E-08	0.0011123	0	0.00040156	5.26E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
365	466824.7	3783297	4.11E-08	0.0008852	0	0.00031956	4.18E-09
366	466999.5	3783297	3.95E-08	0.00085087	0	0.00030717	4.02E-09
367	467174.2	3783297	3.33E-08	0.00071739	0	0.00025898	3.39E-09
368	467349	3783297	3.31E-08	0.00071436	0.00020454	0.00025789	3.38E-09
369	467523.7	3783297	3.19E-08	0.00068855	0.00014018	0.00024857	3.26E-09
370	467698.4	3783297	2.48E-08	0.00053557	0	0.00019334	2.53E-09
371	467873.2	3783297	2.00E-08	0.00043065	0	0.00015547	2.04E-09
372	468047.9	3783297	1.57E-08	0.00033947	0	0.00012255	1.60E-09
373	468222.7	3783297	1.35E-08	0.00029113	0	0.0001051	1.38E-09
374	468397.4	3783297	1.26E-08	0.0002719	0	9.82E-05	1.29E-09
375	466581.1	3780311	-8.58E-07	0	0	0	-9.80E-08
376	466685.2	3780432	-1.43E-06	0	0	0	-1.63E-07
377	466719.3	3780480	-1.75E-06	0	0	0	-2.00E-07
378	466742.4	3780497	-1.88E-06	0	0	0	-2.15E-07
379	466774.5	3780562	-2.47E-06	0	0	0	-2.82E-07
380	466839.6	3780633	-3.26E-06	0	0	0	-3.72E-07
381	466975.7	3780633	-2.56E-06	0	0	0	-2.92E-07
382	466986.8	3780687	-3.09E-06	0	0	0	-3.53E-07
383	466990.9	3780729	-3.62E-06	0	0	0	-4.14E-07
384	466993.1	3780762	-4.14E-06	0	0	0	-4.72E-07
385	467043.1	3780801	-4.11E-06	0	0	0	-4.70E-07
386	467079.1	3780812	-3.79E-06	0	0	0	-4.32E-07
387	467083.1	3780832	-4.01E-06	0	0	0	-4.57E-07
388	467087.1	3780850	-4.20E-06	0	0	0	-4.80E-07
389	467104.2	3780876	-4.28E-06	0	0	0	-4.89E-07
390	467120.2	3780889	-4.17E-06	0	0	0	-4.76E-07
391	467130.2	3780905	-4.17E-06	0	0	0	-4.77E-07
392	467142.2	3780917	-4.08E-06	0	0	0	-4.66E-07
393	467153.2	3780930	-4.00E-06	0	0	0	-4.57E-07
394	467168.2	3780943	-3.84E-06	0	0	0	-4.38E-07
395	467181.2	3780957	-3.70E-06	0	0	0	-4.23E-07
396	467191.2	3780973	-3.59E-06	0	0	0	-4.10E-07
397	467204.2	3780984	-3.42E-06	0	0	0	-3.91E-07
398	467216.2	3780997	-3.26E-06	0	0	0	-3.72E-07
399	467228.3	3781012	-3.09E-06	0	0	0	-3.53E-07
400	467240.3	3781026	-2.92E-06	0	0	0	-3.33E-07
401	467253.3	3781039	-2.74E-06	0	0	0	-3.13E-07
402	467265.3	3781052	-2.57E-06	0	0	0	-2.94E-07
403	467281.3	3781067	-2.36E-06	0	0	0	-2.70E-07
404	467293.3	3781085	-2.19E-06	0	0	0	-2.50E-07
405	467342.3	3781128	-1.67E-06	0	0	0	-1.91E-07
406	467347.3	3781144	-1.58E-06	0	0	0	-1.80E-07
407	467364.3	3781166	-1.40E-06	0	0	0	-1.60E-07
408	467376.3	3781178	-1.31E-06	0	0	0	-1.49E-07
409	467391.4	3781191	-1.20E-06	0	0	0	-1.37E-07
410	467399.4	3781206	-1.12E-06	0	0	0	-1.28E-07
411	467429.4	3781233	-9.51E-07	0	0	0	-1.09E-07
412	467453.4	3781261	-8.20E-07	0	0	0	-9.37E-08
413	467476.4	3781293	-7.04E-07	0	0	0	-8.04E-08
414	467504.4	3781320	-6.09E-07	0	0	0	-6.96E-08
415	467529.4	3781348	-5.33E-07	0	0	0	-6.09E-08
416	467556.4	3781377	-4.67E-07	0	0	0	-5.33E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
417	467582.4	3781403	-4.15E-07	0	0	0	-4.74E-08
418	467613.4	3781428	-3.69E-07	0	0	0	-4.22E-08
419	467701.5	3781546	-2.53E-07	0	0	0	-2.90E-08
420	467519.5	3781907	-1.19E-07	0	0	0	-1.36E-08
421	467382.5	3781967	-1.00E-07	0	0	0	-1.15E-08
422	467213.5	3782162	6.96E-08	0.0014999	0	0.00054146	7.09E-09
423	467117.5	3782332	1.33E-07	0.0028572	0	0.0010315	1.35E-08
424	466887.5	3782625	1.39E-07	0.0029945	0	0.001081	1.42E-08
425	466436.5	3782666	1.64E-07	0.0035452	0.00027431	0.0012798	1.68E-08
426	466309.5	3782601	2.02E-07	0.0043483	0.0007921	0.0015698	2.06E-08
427	466095.5	3782874	1.31E-07	0.0028193	0.0012016	0.0010178	1.33E-08
428	465900	3780360	-2.73E-10	0	0.00078636	0	-3.12E-11
429	465950	3780360	-4.47E-08	0	0.00032946	0	-5.11E-09
430	466000	3780360	-9.59E-08	0	0	0	-1.10E-08
431	466050	3780360	-1.54E-07	0	0	0	-1.76E-08
432	466100	3780360	-2.19E-07	0	0	0	-2.50E-08
433	466150	3780360	-2.91E-07	0	0	0	-3.33E-08
434	466200	3780360	-3.69E-07	0	0	0	-4.22E-08
435	466250	3780360	-4.50E-07	0	0	0	-5.14E-08
436	466300	3780360	-5.37E-07	0	0	0	-6.13E-08
437	466350	3780360	-6.29E-07	0	0	0	-7.19E-08
438	466400	3780360	-7.23E-07	0	0	0	-8.26E-08
439	466550	3780360	-9.68E-07	0	0	0	-1.11E-07
440	466600	3780360	-1.03E-06	0	0	0	-1.18E-07
441	466650	3780360	-1.08E-06	0	0	0	-1.23E-07
442	466700	3780360	-1.11E-06	0	0	0	-1.27E-07
443	466750	3780360	-1.12E-06	0	0	0	-1.28E-07
444	466800	3780360	-1.12E-06	0	0	0	-1.28E-07
445	466850	3780360	-1.11E-06	0	0	0	-1.26E-07
446	466900	3780360	-1.08E-06	0	0	0	-1.23E-07
447	466950	3780360	-1.04E-06	0	0	0	-1.19E-07
448	467000	3780360	-9.97E-07	0	0	0	-1.14E-07
449	467050	3780360	-9.49E-07	0	0	0	-1.08E-07
450	467100	3780360	-8.97E-07	0	0	0	-1.03E-07
451	467150	3780360	-8.44E-07	0	0	0	-9.64E-08
452	467200	3780360	-7.93E-07	0	0	0	-9.05E-08
453	467250	3780360	-7.41E-07	0	0	0	-8.46E-08
454	467300	3780360	-6.92E-07	0	0	0	-7.90E-08
455	467350	3780360	-6.45E-07	0	0	0	-7.36E-08
456	467400	3780360	-6.01E-07	0	0	0	-6.86E-08
457	467450	3780360	-5.59E-07	0	0	0	-6.39E-08
458	467500	3780360	-5.21E-07	0	0	0	-5.95E-08
459	465900	3780410	3.54E-08	0.0007638	0.00093202	0.00027574	3.61E-09
460	465950	3780410	-1.86E-08	0	0.00051978	0	-2.12E-09
461	466000	3780410	-7.64E-08	0	0	0	-8.73E-09
462	466050	3780410	-1.44E-07	0	0	0	-1.64E-08
463	466100	3780410	-2.20E-07	0	0	0	-2.52E-08
464	466150	3780410	-3.06E-07	0	0	0	-3.49E-08
465	466200	3780410	-4.00E-07	0	0	0	-4.56E-08
466	466250	3780410	-5.00E-07	0	0	0	-5.71E-08
467	466300	3780410	-6.06E-07	0	0	0	-6.93E-08
468	466350	3780410	-7.21E-07	0	0	0	-8.24E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
469	466600	3780410	-1.23E-06	0	0	0	-1.40E-07
470	466650	3780410	-1.29E-06	0	0	0	-1.47E-07
471	466700	3780410	-1.32E-06	0	0	0	-1.51E-07
472	466750	3780410	-1.34E-06	0	0	0	-1.53E-07
473	466800	3780410	-1.33E-06	0	0	0	-1.52E-07
474	466850	3780410	-1.31E-06	0	0	0	-1.49E-07
475	466900	3780410	-1.27E-06	0	0	0	-1.45E-07
476	466950	3780410	-1.21E-06	0	0	0	-1.39E-07
477	467000	3780410	-1.16E-06	0	0	0	-1.32E-07
478	467050	3780410	-1.09E-06	0	0	0	-1.25E-07
479	467100	3780410	-1.02E-06	0	0	0	-1.17E-07
480	467150	3780410	-9.57E-07	0	0	0	-1.09E-07
481	467200	3780410	-8.92E-07	0	0	0	-1.02E-07
482	467250	3780410	-8.28E-07	0	0	0	-9.46E-08
483	467300	3780410	-7.68E-07	0	0	0	-8.77E-08
484	467350	3780410	-7.12E-07	0	0	0	-8.13E-08
485	467400	3780410	-6.60E-07	0	0	0	-7.54E-08
486	467450	3780410	-6.12E-07	0	0	0	-6.98E-08
487	467500	3780410	-5.67E-07	0	0	0	-6.48E-08
488	465900	3780460	8.36E-08	0.0018031	0.0011428	0.00065093	8.52E-09
489	465950	3780460	2.10E-08	0.00045262	0.00073648	0.0001634	2.14E-09
490	466000	3780460	-4.70E-08	0	2.73E-05	0	-5.37E-09
491	466050	3780460	-1.24E-07	0	0	0	-1.42E-08
492	466100	3780460	-2.14E-07	0	0	0	-2.44E-08
493	466150	3780460	-3.17E-07	0	0	0	-3.62E-08
494	466200	3780460	-4.30E-07	0	0	0	-4.91E-08
495	466250	3780460	-5.54E-07	0	0	0	-6.33E-08
496	466300	3780460	-6.87E-07	0	0	0	-7.84E-08
497	466350	3780460	-8.32E-07	0	0	0	-9.50E-08
498	466600	3780460	-1.48E-06	0	0	0	-1.69E-07
499	466650	3780460	-1.56E-06	0	0	0	-1.78E-07
500	466700	3780460	-1.60E-06	0	0	0	-1.83E-07
501	466750	3780460	-1.62E-06	0	0	0	-1.85E-07
502	466800	3780460	-1.60E-06	0	0	0	-1.83E-07
503	466850	3780460	-1.56E-06	0	0	0	-1.78E-07
504	466900	3780460	-1.50E-06	0	0	0	-1.72E-07
505	466950	3780460	-1.43E-06	0	0	0	-1.63E-07
506	467000	3780460	-1.35E-06	0	0	0	-1.54E-07
507	467050	3780460	-1.26E-06	0	0	0	-1.44E-07
508	467100	3780460	-1.17E-06	0	0	0	-1.34E-07
509	467150	3780460	-1.09E-06	0	0	0	-1.24E-07
510	467200	3780460	-1.01E-06	0	0	0	-1.15E-07
511	467250	3780460	-9.28E-07	0	0	0	-1.06E-07
512	467300	3780460	-8.55E-07	0	0	0	-9.77E-08
513	467350	3780460	-7.88E-07	0	0	0	-9.00E-08
514	467400	3780460	-7.26E-07	0	0	0	-8.30E-08
515	467450	3780460	-6.70E-07	0	0	0	-7.65E-08
516	467500	3780460	-6.19E-07	0	0	0	-7.07E-08
517	465900	3780510	1.47E-07	0.0031714	0.0013097	0.0011449	1.50E-08
518	465950	3780510	7.95E-08	0.0017133	0.0010174	0.0006185	8.10E-09
519	466000	3780510	-3.92E-09	0	0.00026614	0	-4.48E-10
520	466050	3780510	-9.20E-08	0	0	0	-1.05E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
521	466100	3780510	-1.96E-07	0	0	0	-2.24E-08
522	466150	3780510	-3.21E-07	0	0	0	-3.66E-08
523	466200	3780510	-4.58E-07	0	0	0	-5.23E-08
524	466250	3780510	-6.11E-07	0	0	0	-6.98E-08
525	466300	3780510	-7.78E-07	0	0	0	-8.89E-08
526	466350	3780510	-9.63E-07	0	0	0	-1.10E-07
527	466650	3780510	-1.91E-06	0	0	0	-2.18E-07
528	466700	3780510	-1.97E-06	0	0	0	-2.25E-07
529	466750	3780510	-1.98E-06	0	0	0	-2.26E-07
530	466800	3780510	-1.95E-06	0	0	0	-2.23E-07
531	466850	3780510	-1.89E-06	0	0	0	-2.16E-07
532	466900	3780510	-1.80E-06	0	0	0	-2.06E-07
533	466950	3780510	-1.70E-06	0	0	0	-1.94E-07
534	467000	3780510	-1.58E-06	0	0	0	-1.81E-07
535	467050	3780510	-1.47E-06	0	0	0	-1.68E-07
536	467100	3780510	-1.35E-06	0	0	0	-1.55E-07
537	467150	3780510	-1.24E-06	0	0	0	-1.42E-07
538	467200	3780510	-1.14E-06	0	0	0	-1.30E-07
539	467250	3780510	-1.04E-06	0	0	0	-1.19E-07
540	467300	3780510	-9.54E-07	0	0	0	-1.09E-07
541	467350	3780510	-8.74E-07	0	0	0	-9.98E-08
542	467400	3780510	-8.01E-07	0	0	0	-9.15E-08
543	467450	3780510	-7.35E-07	0	0	0	-8.40E-08
544	467500	3780510	-6.76E-07	0	0	0	-7.72E-08
545	465900	3780560	2.30E-07	0.0049495	0.001485	0.0017868	2.34E-08
546	465950	3780560	1.58E-07	0.0034166	0.0013507	0.0012334	1.62E-08
547	466000	3780560	6.67E-08	0.0014386	0.00055589	0.00051935	6.80E-09
548	466050	3780560	-4.21E-08	0	0	0	-4.81E-09
549	466100	3780560	-1.68E-07	0	0	0	-1.92E-08
550	466150	3780560	-3.12E-07	0	0	0	-3.56E-08
551	466200	3780560	-4.78E-07	0	0	0	-5.46E-08
552	466250	3780560	-6.69E-07	0	0	0	-7.64E-08
553	466300	3780560	-8.81E-07	0	0	0	-1.01E-07
554	466350	3780560	-1.12E-06	0	0	0	-1.27E-07
555	466700	3780560	-2.45E-06	0	0	0	-2.80E-07
556	466750	3780560	-2.48E-06	0	0	0	-2.83E-07
557	466800	3780560	-2.42E-06	0	0	0	-2.76E-07
558	466850	3780560	-2.32E-06	0	0	0	-2.65E-07
559	466900	3780560	-2.19E-06	0	0	0	-2.50E-07
560	466950	3780560	-2.03E-06	0	0	0	-2.32E-07
561	467000	3780560	-1.88E-06	0	0	0	-2.14E-07
562	467050	3780560	-1.72E-06	0	0	0	-1.96E-07
563	467100	3780560	-1.57E-06	0	0	0	-1.79E-07
564	467150	3780560	-1.42E-06	0	0	0	-1.63E-07
565	467200	3780560	-1.29E-06	0	0	0	-1.48E-07
566	467250	3780560	-1.17E-06	0	0	0	-1.34E-07
567	467300	3780560	-1.07E-06	0	0	0	-1.22E-07
568	467350	3780560	-9.71E-07	0	0	0	-1.11E-07
569	467400	3780560	-8.85E-07	0	0	0	-1.01E-07
570	467450	3780560	-8.08E-07	0	0	0	-9.23E-08
571	467500	3780560	-7.40E-07	0	0	0	-8.45E-08
572	465900	3780610	3.37E-07	0.0072595	0.0011515	0.0026208	3.43E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
573	465950	3780610	2.64E-07	0.0056946	0.0014948	0.0020558	2.69E-08
574	466000	3780610	1.66E-07	0.0035746	0.0009531	0.0012905	1.69E-08
575	466050	3780610	3.64E-08	0.00078577	0	0.00028367	3.71E-09
576	466100	3780610	-1.14E-07	0	0	0	-1.30E-08
577	466150	3780610	-2.83E-07	0	0	0	-3.24E-08
578	466200	3780610	-4.85E-07	0	0	0	-5.54E-08
579	466250	3780610	-7.21E-07	0	0	0	-8.24E-08
580	466300	3780610	-9.92E-07	0	0	0	-1.13E-07
581	466750	3780610	-3.12E-06	0	0	0	-3.56E-07
582	466800	3780610	-3.05E-06	0	0	0	-3.49E-07
583	466850	3780610	-2.89E-06	0	0	0	-3.30E-07
584	466900	3780610	-2.69E-06	0	0	0	-3.07E-07
585	466950	3780610	-2.46E-06	0	0	0	-2.81E-07
586	467000	3780610	-2.24E-06	0	0	0	-2.56E-07
587	467050	3780610	-2.02E-06	0	0	0	-2.31E-07
588	467100	3780610	-1.82E-06	0	0	0	-2.08E-07
589	467150	3780610	-1.64E-06	0	0	0	-1.87E-07
590	467200	3780610	-1.47E-06	0	0	0	-1.68E-07
591	467250	3780610	-1.33E-06	0	0	0	-1.51E-07
592	467300	3780610	-1.20E-06	0	0	0	-1.37E-07
593	467350	3780610	-1.08E-06	0	0	0	-1.23E-07
594	467400	3780610	-9.80E-07	0	0	0	-1.12E-07
595	467450	3780610	-8.90E-07	0	0	0	-1.02E-07
596	467500	3780610	-8.11E-07	0	0	0	-9.26E-08
597	465900	3780660	4.76E-07	0.010264	0.00076807	0.0037053	4.85E-08
598	465950	3780660	4.04E-07	0.0087174	0.0011537	0.0031471	4.12E-08
599	466000	3780660	3.01E-07	0.0064993	0.00073778	0.0023463	3.07E-08
600	466050	3780660	1.53E-07	0.0032906	0	0.0011879	1.56E-08
601	466100	3780660	-2.81E-08	0	0	0	-3.21E-09
602	466150	3780660	-2.26E-07	0	0	0	-2.58E-08
603	466200	3780660	-4.67E-07	0	0	0	-5.34E-08
604	466250	3780660	-7.59E-07	0	0	0	-8.67E-08
605	466300	3780660	-1.10E-06	0	0	0	-1.26E-07
606	466800	3780660	-3.89E-06	0	0	0	-4.45E-07
607	466850	3780660	-3.67E-06	0	0	0	-4.19E-07
608	466900	3780660	-3.34E-06	0	0	0	-3.82E-07
609	466950	3780660	-3.02E-06	0	0	0	-3.44E-07
610	467000	3780660	-2.70E-06	0	0	0	-3.08E-07
611	467050	3780660	-2.40E-06	0	0	0	-2.74E-07
612	467100	3780660	-2.13E-06	0	0	0	-2.43E-07
613	467150	3780660	-1.89E-06	0	0	0	-2.16E-07
614	467200	3780660	-1.68E-06	0	0	0	-1.92E-07
615	467250	3780660	-1.50E-06	0	0	0	-1.72E-07
616	467300	3780660	-1.34E-06	0	0	0	-1.54E-07
617	467350	3780660	-1.21E-06	0	0	0	-1.38E-07
618	467400	3780660	-1.09E-06	0	0	0	-1.24E-07
619	467450	3780660	-9.80E-07	0	0	0	-1.12E-07
620	467500	3780660	-8.88E-07	0	0	0	-1.01E-07
621	465900	3780710	6.55E-07	0.014131	0.00082408	0.0051013	6.68E-08
622	465950	3780710	5.90E-07	0.012722	0.001271	0.0045926	6.01E-08
623	466000	3780710	4.87E-07	0.010506	0.00070611	0.0037929	4.97E-08
624	466050	3780710	3.25E-07	0.0069981	0	0.0025264	3.31E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
625	466100	3780710	1.21E-07	0.0025982	0	0.00093797	1.23E-08
626	466150	3780710	-1.26E-07	0	0	0	-1.44E-08
627	466250	3780710	-7.69E-07	0	0	0	-8.78E-08
628	466300	3780710	-1.21E-06	0	0	0	-1.38E-07
629	466850	3780710	-4.70E-06	0	0	0	-5.37E-07
630	466900	3780710	-4.25E-06	0	0	0	-4.85E-07
631	466950	3780710	-3.74E-06	0	0	0	-4.27E-07
632	467000	3780710	-3.27E-06	0	0	0	-3.74E-07
633	467050	3780710	-2.86E-06	0	0	0	-3.27E-07
634	467100	3780710	-2.50E-06	0	0	0	-2.86E-07
635	467150	3780710	-2.20E-06	0	0	0	-2.51E-07
636	467200	3780710	-1.93E-06	0	0	0	-2.21E-07
637	467250	3780710	-1.71E-06	0	0	0	-1.95E-07
638	467300	3780710	-1.51E-06	0	0	0	-1.73E-07
639	467350	3780710	-1.35E-06	0	0	0	-1.54E-07
640	467400	3780710	-1.20E-06	0	0	0	-1.37E-07
641	467450	3780710	-1.08E-06	0	0	0	-1.23E-07
642	467500	3780710	-9.71E-07	0	0	0	-1.11E-07
643	465900	3780760	8.87E-07	0.019115	0.001334	0.0069006	9.04E-08
644	465950	3780760	8.35E-07	0.01801	0.0020637	0.0065017	8.51E-08
645	466000	3780760	7.28E-07	0.015692	0.0015358	0.0056648	7.42E-08
646	466050	3780760	5.70E-07	0.012297	0	0.0044394	5.81E-08
647	466100	3780760	3.48E-07	0.0074996	0	0.0027074	3.55E-08
648	466250	3780760	-7.27E-07	0	0	0	-8.31E-08
649	466300	3780760	-1.28E-06	0	0	0	-1.46E-07
650	466900	3780760	-5.44E-06	0	0	0	-6.21E-07
651	466950	3780760	-4.70E-06	0	0	0	-5.36E-07
652	467000	3780760	-4.01E-06	0	0	0	-4.58E-07
653	467050	3780760	-3.44E-06	0	0	0	-3.93E-07
654	467100	3780760	-2.96E-06	0	0	0	-3.38E-07
655	467150	3780760	-2.56E-06	0	0	0	-2.92E-07
656	467200	3780760	-2.22E-06	0	0	0	-2.54E-07
657	467250	3780760	-1.94E-06	0	0	0	-2.22E-07
658	467300	3780760	-1.70E-06	0	0	0	-1.94E-07
659	467350	3780760	-1.50E-06	0	0	0	-1.72E-07
660	467400	3780760	-1.33E-06	0	0	0	-1.52E-07
661	467450	3780760	-1.18E-06	0	0	0	-1.35E-07
662	467500	3780760	-1.06E-06	0	0	0	-1.21E-07
663	465900	3780810	1.18E-06	0.025479	0.0023162	0.009198	1.20E-07
664	465950	3780810	1.16E-06	0.02497	0.0030194	0.0090144	1.18E-07
665	466000	3780810	1.07E-06	0.023	0.0032482	0.0083033	1.09E-07
666	466050	3780810	9.16E-07	0.019739	0.0013254	0.0071259	9.33E-08
667	466100	3780810	6.80E-07	0.01465	0	0.0052886	6.93E-08
668	466250	3780810	-6.12E-07	0	0	0	-6.99E-08
669	466300	3780810	-1.29E-06	0	0	0	-1.48E-07
670	466950	3780810	-5.96E-06	0	0	0	-6.80E-07
671	467000	3780810	-4.97E-06	0	0	0	-5.68E-07
672	467050	3780810	-4.16E-06	0	0	0	-4.75E-07
673	467100	3780810	-3.50E-06	0	0	0	-4.00E-07
674	467150	3780810	-2.98E-06	0	0	0	-3.40E-07
675	467200	3780810	-2.55E-06	0	0	0	-2.91E-07
676	467250	3780810	-2.20E-06	0	0	0	-2.51E-07

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
677	467300	3780810	-1.91E-06	0	0	0	-2.18E-07
678	467350	3780810	-1.66E-06	0	0	0	-1.90E-07
679	467400	3780810	-1.46E-06	0	0	0	-1.67E-07
680	467450	3780810	-1.29E-06	0	0	0	-1.47E-07
681	467500	3780810	-1.14E-06	0	0	0	-1.30E-07
682	465900	3780860	1.56E-06	0.033688	0.0032237	0.012162	1.59E-07
683	465950	3780860	1.58E-06	0.033963	0.0032595	0.012261	1.61E-07
684	466000	3780860	1.52E-06	0.03285	0.004384	0.011859	1.55E-07
685	466050	3780860	1.40E-06	0.030087	0.0032706	0.010862	1.42E-07
686	466100	3780860	1.16E-06	0.024946	0.00067082	0.0090057	1.18E-07
687	466250	3780860	-3.77E-07	0	0	0	-4.30E-08
688	466300	3780860	-1.20E-06	0	0	0	-1.37E-07
689	467000	3780860	-6.18E-06	0	0	0	-7.05E-07
690	467050	3780860	-5.03E-06	0	0	0	-5.75E-07
691	467100	3780860	-4.13E-06	0	0	0	-4.72E-07
692	467150	3780860	-3.44E-06	0	0	0	-3.93E-07
693	467200	3780860	-2.90E-06	0	0	0	-3.31E-07
694	467250	3780860	-2.46E-06	0	0	0	-2.81E-07
695	467300	3780860	-2.11E-06	0	0	0	-2.41E-07
696	467350	3780860	-1.82E-06	0	0	0	-2.08E-07
697	467400	3780860	-1.58E-06	0	0	0	-1.80E-07
698	467450	3780860	-1.38E-06	0	0	0	-1.58E-07
699	467500	3780860	-1.22E-06	0	0	0	-1.39E-07
700	465900	3780910	2.04E-06	0.044071	0.0035994	0.01591	2.08E-07
701	465950	3780910	2.13E-06	0.045955	0.0037151	0.01659	2.17E-07
702	466000	3780910	2.15E-06	0.046253	0.0053473	0.016698	2.19E-07
703	466050	3780910	2.07E-06	0.044521	0.004906	0.016072	2.10E-07
704	466300	3780910	-9.29E-07	0	0	0	-1.06E-07
705	466350	3780910	-2.25E-06	0	0	0	-2.57E-07
706	466400	3780910	-4.06E-06	0	0	0	-4.64E-07
707	467050	3780910	-5.98E-06	0	0	0	-6.83E-07
708	467100	3780910	-4.79E-06	0	0	0	-5.48E-07
709	467150	3780910	-3.90E-06	0	0	0	-4.45E-07
710	467200	3780910	-3.22E-06	0	0	0	-3.68E-07
711	467250	3780910	-2.70E-06	0	0	0	-3.08E-07
712	467300	3780910	-2.28E-06	0	0	0	-2.60E-07
713	467350	3780910	-1.94E-06	0	0	0	-2.22E-07
714	467400	3780910	-1.67E-06	0	0	0	-1.91E-07
715	467450	3780910	-1.45E-06	0	0	0	-1.66E-07
716	467500	3780910	-1.27E-06	0	0	0	-1.45E-07
717	465900	3780960	2.67E-06	0.057513	0.0026344	0.020763	2.72E-07
718	465950	3780960	2.87E-06	0.061814	0.003719	0.022315	2.92E-07
719	466000	3780960	3.00E-06	0.064674	0.0045646	0.023348	3.06E-07
720	466050	3780960	3.02E-06	0.065084	0.0050828	0.023496	3.08E-07
721	466300	3780960	-3.69E-07	0	0.00074776	0	-4.22E-08
722	466350	3780960	-1.96E-06	0	0.00024393	0	-2.24E-07
723	466400	3780960	-4.14E-06	0	0	0	-4.73E-07
724	467050	3780960	-6.79E-06	0	0	0	-7.75E-07
725	467100	3780960	-5.30E-06	0	0	0	-6.06E-07
726	467150	3780960	-4.23E-06	0	0	0	-4.83E-07
727	467200	3780960	-3.44E-06	0	0	0	-3.93E-07
728	467250	3780960	-2.84E-06	0	0	0	-3.24E-07

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
729	467300	3780960	-2.38E-06	0	0	0	-2.72E-07
730	467350	3780960	-2.01E-06	0	0	0	-2.30E-07
731	467400	3780960	-1.72E-06	0	0	0	-1.96E-07
732	467450	3780960	-1.48E-06	0	0	0	-1.69E-07
733	467500	3780960	-1.29E-06	0	0	0	-1.47E-07
734	465900	3781010	3.46E-06	0.074634	0.0047742	0.026943	3.53E-07
735	465950	3781010	3.86E-06	0.083128	0.0045446	0.03001	3.93E-07
736	466000	3781010	4.20E-06	0.09062	0.0046027	0.032715	4.28E-07
737	466050	3781010	4.40E-06	0.094927	0.0067487	0.034269	4.49E-07
738	466300	3781010	6.25E-07	0.013464	0	0.0048607	6.37E-08
739	467100	3781010	-5.45E-06	0	0	0	-6.22E-07
740	467150	3781010	-4.31E-06	0	0	0	-4.92E-07
741	467200	3781010	-3.47E-06	0	0	0	-3.96E-07
742	467250	3781010	-2.85E-06	0	0	0	-3.25E-07
743	467300	3781010	-2.37E-06	0	0	0	-2.71E-07
744	467350	3781010	-2.00E-06	0	0	0	-2.28E-07
745	467400	3781010	-1.70E-06	0	0	0	-1.94E-07
746	467450	3781010	-1.46E-06	0	0	0	-1.67E-07
747	467500	3781010	-1.27E-06	0	0	0	-1.45E-07
748	465900	3781060	4.47E-06	0.096365	0.0081959	0.034789	4.56E-07
749	465950	3781060	5.20E-06	0.11219	0.0073558	0.0405	5.30E-07
750	466000	3781060	5.92E-06	0.12757	0.0084895	0.046054	6.03E-07
751	466300	3781060	2.31E-06	0.049729	0.0033903	0.017952	2.35E-07
752	466350	3781060	-6.17E-08	0	0	0	-7.05E-09
753	467150	3781060	-4.05E-06	0	0	0	-4.63E-07
754	467200	3781060	-3.28E-06	0	0	0	-3.74E-07
755	467250	3781060	-2.69E-06	0	0	0	-3.07E-07
756	467300	3781060	-2.24E-06	0	0	0	-2.56E-07
757	467350	3781060	-1.89E-06	0	0	0	-2.16E-07
758	467400	3781060	-1.61E-06	0	0	0	-1.84E-07
759	467450	3781060	-1.38E-06	0	0	0	-1.58E-07
760	467500	3781060	-1.20E-06	0	0	0	-1.37E-07
761	465900	3781110	5.74E-06	0.12383	0.0085251	0.044703	5.85E-07
762	465950	3781110	7.02E-06	0.15136	0.011406	0.054643	7.16E-07
763	466000	3781110	8.42E-06	0.18141	0.010585	0.065491	8.58E-07
764	466350	3781110	2.23E-06	0.048129	0.0013124	0.017375	2.28E-07
765	467200	3781110	-2.90E-06	0	0	0	-3.32E-07
766	467250	3781110	-2.41E-06	0	0	0	-2.75E-07
767	467300	3781110	-2.02E-06	0	0	0	-2.30E-07
768	467350	3781110	-1.71E-06	0	0	0	-1.95E-07
769	467400	3781110	-1.46E-06	0	0	0	-1.67E-07
770	467450	3781110	-1.26E-06	0	0	0	-1.44E-07
771	467500	3781110	-1.10E-06	0	0	0	-1.26E-07
772	465900	3781160	7.30E-06	0.15742	0.0057031	0.056829	7.44E-07
773	465950	3781160	9.44E-06	0.20361	0.012692	0.073503	9.63E-07
774	466000	3781160	1.21E-05	0.26179	0.016703	0.094507	1.24E-06
775	466350	3781160	5.39E-06	0.11619	0.0049598	0.041944	5.49E-07
776	467250	3781160	-2.06E-06	0	0	0	-2.36E-07
777	467300	3781160	-1.75E-06	0	0	0	-2.00E-07
778	467350	3781160	-1.49E-06	0	0	0	-1.71E-07
779	467400	3781160	-1.29E-06	0	0	0	-1.47E-07
780	467450	3781160	-1.12E-06	0	0	0	-1.28E-07

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
781	467500	3781160	-9.78E-07	0	0	0	-1.12E-07
782	465900	3781210	9.01E-06	0.19434	0.011517	0.070157	9.19E-07
783	465950	3781210	1.25E-05	0.26918	0.0096302	0.097176	1.27E-06
784	466350	3781210	9.57E-06	0.20621	0.0032931	0.074443	9.75E-07
785	467300	3781210	-1.48E-06	0	0	0	-1.69E-07
786	467350	3781210	-1.27E-06	0	0	0	-1.46E-07
787	467400	3781210	-1.11E-06	0	0	0	-1.26E-07
788	467450	3781210	-9.68E-07	0	0	0	-1.11E-07
789	467500	3781210	-8.52E-07	0	0	0	-9.73E-08
790	465900	3781260	1.06E-05	0.22938	0.014523	0.082809	1.08E-06
791	465950	3781260	1.58E-05	0.34016	0.021178	0.1228	1.61E-06
792	466350	3781260	1.50E-05	0.32274	0.0075624	0.11651	1.53E-06
793	466400	3781260	8.78E-06	0.18924	0.0018905	0.068316	8.95E-07
794	467350	3781260	-1.08E-06	0	0	0	-1.23E-07
795	467400	3781260	-9.43E-07	0	0	0	-1.08E-07
796	467450	3781260	-8.30E-07	0	0	0	-9.48E-08
797	467500	3781260	-7.35E-07	0	0	0	-8.39E-08
798	465900	3781310	1.17E-05	0.25326	0.013138	0.091428	1.20E-06
799	465950	3781310	1.83E-05	0.39548	0.016829	0.14277	1.87E-06
800	466400	3781310	1.20E-05	0.25796	0.0014649	0.093127	1.22E-06
801	467400	3781310	-8.06E-07	0	0	0	-9.20E-08
802	467450	3781310	-7.12E-07	0	0	0	-8.13E-08
803	467500	3781310	-6.34E-07	0	0	0	-7.24E-08
804	465900	3781360	1.20E-05	0.25877	0.014206	0.093419	1.22E-06
805	466400	3781360	1.27E-05	0.27398	0.0048951	0.098909	1.30E-06
806	467450	3781360	-6.17E-07	0	0	0	-7.04E-08
807	467500	3781360	-5.50E-07	0	0	0	-6.29E-08
808	465900	3781410	1.13E-05	0.24345	0.013198	0.087889	1.15E-06
809	467500	3781410	-4.85E-07	0	0	0	-5.53E-08
810	467500	3781460	-4.32E-07	0	0	0	-4.94E-08
811	465900	3781610	5.30E-06	0.11429	0.0036119	0.04126	5.40E-07
812	465950	3781610	6.43E-06	0.13862	0.0047777	0.050044	6.55E-07
813	466000	3781610	7.84E-06	0.16895	0.0049866	0.060993	7.99E-07
814	466450	3781610	3.38E-06	0.072768	0	0.02627	3.44E-07
815	465900	3781660	4.42E-06	0.09535	0.0022205	0.034422	4.51E-07
816	465950	3781660	4.98E-06	0.10738	0.0043663	0.038765	5.08E-07
817	467500	3781660	-2.95E-07	0	0	0	-3.37E-08
818	465900	3781710	3.47E-06	0.074748	0.0033742	0.026985	3.53E-07
819	465950	3781710	3.82E-06	0.082399	0.0038404	0.029747	3.90E-07
820	466500	3781710	1.91E-06	0.041249	0	0.014891	1.95E-07
821	467450	3781710	-2.81E-07	0	0	0	-3.21E-08
822	467500	3781710	-2.44E-07	0	0	0	-2.79E-08
823	465900	3781760	2.84E-06	0.06131	0.002181	0.022134	2.90E-07
824	466500	3781760	1.65E-06	0.035542	0	0.012831	1.68E-07
825	467400	3781760	-2.52E-07	0	0	0	-2.88E-08
826	467450	3781760	-2.27E-07	0	0	0	-2.60E-08
827	467500	3781760	-2.36E-07	0	0	0	-2.69E-08
828	465900	3781810	2.36E-06	0.050857	0.0021686	0.01836	2.40E-07
829	466500	3781810	1.43E-06	0.030917	0	0.011161	1.46E-07
830	467400	3781810	-2.07E-07	0	0	0	-2.37E-08
831	467450	3781810	-2.05E-07	0	0	0	-2.34E-08
832	467500	3781810	-1.99E-07	0	0	0	-2.28E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
833	465900	3781860	1.87E-06	0.040332	0.0032584	0.01456	1.91E-07
834	466500	3781860	1.25E-06	0.026951	0	0.0097296	1.27E-07
835	467350	3781860	-1.75E-07	0	0	0	-2.00E-08
836	467400	3781860	-1.68E-07	0	0	0	-1.91E-08
837	467450	3781860	-1.75E-07	0	0	0	-2.00E-08
838	467500	3781860	-1.76E-07	0	0	0	-2.01E-08
839	465900	3781910	1.50E-06	0.032376	0.0025141	0.011688	1.53E-07
840	466500	3781910	1.09E-06	0.023466	0	0.0084713	1.11E-07
841	467300	3781910	-1.33E-07	0	0	0	-1.52E-08
842	467350	3781910	-1.27E-07	0	0	0	-1.45E-08
843	467400	3781910	-1.42E-07	0	0	0	-1.62E-08
844	467450	3781910	-1.30E-07	0	0	0	-1.49E-08
845	467500	3781910	-1.20E-07	0	0	0	-1.37E-08
846	465900	3781960	1.30E-06	0.028101	0.0016419	0.010145	1.33E-07
847	466500	3781960	9.50E-07	0.020481	0	0.0073938	9.68E-08
848	467250	3781960	-9.17E-08	0	0	0	-1.05E-08
849	467300	3781960	-7.62E-08	0	0	0	-8.71E-09
850	467350	3781960	-1.11E-07	0	0	0	-1.27E-08
851	467400	3781960	-1.04E-07	0	0	0	-1.18E-08
852	467450	3781960	-1.03E-07	0	0	0	-1.18E-08
853	467500	3781960	-1.02E-07	0	0	0	-1.16E-08
854	465900	3782010	1.10E-06	0.023605	0.0014892	0.0085216	1.12E-07
855	465950	3782010	1.13E-06	0.02436	0.0026828	0.0087942	1.15E-07
856	466500	3782010	7.61E-07	0.0164	0	0.0059205	7.75E-08
857	467250	3782010	-2.40E-08	0	0	0	-2.74E-09
858	467300	3782010	-7.81E-08	0	0	0	-8.92E-09
859	467350	3782010	-8.52E-08	0	0	0	-9.73E-09
860	467400	3782010	-8.53E-08	0	0	0	-9.74E-09
861	467450	3782010	-8.83E-08	0	0	0	-1.01E-08
862	467500	3782010	-8.74E-08	0	0	0	-9.98E-09
863	465900	3782060	9.17E-07	0.019762	0.0014653	0.0071342	9.34E-08
864	465950	3782060	9.12E-07	0.019668	0.0026444	0.0071005	9.30E-08
865	466500	3782060	6.45E-07	0.013897	0	0.0050169	6.57E-08
866	467200	3782060	2.22E-08	0.00047926	0	0.00017302	2.27E-09
867	467250	3782060	-1.44E-08	0	0	0	-1.65E-09
868	467300	3782060	-5.40E-08	0	0	0	-6.17E-09
869	467350	3782060	-6.29E-08	0	0	0	-7.18E-09
870	467400	3782060	-7.02E-08	0	0	0	-8.01E-09
871	467450	3782060	-7.19E-08	0	0	0	-8.21E-09
872	467500	3782060	-7.47E-08	0	0	0	-8.54E-09
873	465900	3782110	7.75E-07	0.016707	0.0016407	0.0060315	7.90E-08
874	465950	3782110	7.68E-07	0.016554	0.0023828	0.005976	7.83E-08
875	467150	3782110	7.23E-08	0.0015586	0	0.00056268	7.37E-09
876	467200	3782110	5.13E-08	0.0011066	0	0.00039948	5.23E-09
877	467250	3782110	2.24E-08	0.00048256	0	0.00017421	2.28E-09
878	467300	3782110	-2.56E-08	0	0	0	-2.92E-09
879	467350	3782110	-3.62E-08	0	0	0	-4.14E-09
880	467400	3782110	-5.13E-08	0	0	0	-5.86E-09
881	467450	3782110	-5.33E-08	0	0	0	-6.08E-09
882	467500	3782110	-6.19E-08	0	0	0	-7.07E-09
883	465900	3782160	6.61E-07	0.014258	0.0018127	0.0051474	6.74E-08
884	465950	3782160	6.80E-07	0.014661	0.0018119	0.0052928	6.93E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
885	466450	3782160	6.49E-07	0.013999	0	0.0050537	6.62E-08
886	467100	3782160	1.18E-07	0.0025463	0	0.00091923	1.20E-08
887	467150	3782160	9.84E-08	0.0021208	0	0.00076564	1.00E-08
888	467200	3782160	7.07E-08	0.0015249	0	0.00055049	7.21E-09
889	467250	3782160	4.58E-08	0.00098819	0	0.00035675	4.67E-09
890	467300	3782160	-1.96E-09	0	0	0	-2.24E-10
891	467350	3782160	-1.37E-08	0	0	0	-1.56E-09
892	467400	3782160	-2.42E-08	0	0	0	-2.77E-09
893	467450	3782160	-2.99E-08	0	0	0	-3.41E-09
894	467500	3782160	-3.30E-08	0	0	0	-3.76E-09
895	465900	3782210	5.68E-07	0.012251	0.0019579	0.0044227	5.79E-08
896	465950	3782210	5.87E-07	0.012656	0.001193	0.0045691	5.98E-08
897	466000	3782210	5.89E-07	0.012706	0.0013183	0.0045868	6.01E-08
898	466450	3782210	4.91E-07	0.010588	0	0.0038224	5.01E-08
899	467050	3782210	1.50E-07	0.0032403	0	0.0011698	1.53E-08
900	467100	3782210	1.31E-07	0.0028187	0	0.0010176	1.33E-08
901	467150	3782210	1.04E-07	0.0022508	0	0.00081254	1.06E-08
902	467200	3782210	8.64E-08	0.0018616	0	0.00067205	8.80E-09
903	467250	3782210	6.08E-08	0.0013115	0	0.00047345	6.20E-09
904	467300	3782210	3.40E-08	0.00073222	0	0.00026434	3.46E-09
905	467350	3782210	5.82E-09	0.00012552	0	4.53E-05	5.93E-10
906	467400	3782210	-4.78E-09	0	0	0	-5.46E-10
907	467450	3782210	-8.36E-09	0	0	0	-9.55E-10
908	467500	3782210	-1.24E-08	0	0	0	-1.41E-09
909	465900	3782260	4.91E-07	0.010587	0.0017207	0.0038221	5.01E-08
910	465950	3782260	5.05E-07	0.010878	0.0012422	0.0039272	5.14E-08
911	466000	3782260	4.94E-07	0.010653	0.0013805	0.0038457	5.04E-08
912	466450	3782260	3.76E-07	0.0081055	0	0.0029261	3.83E-08
913	467050	3782260	1.55E-07	0.0033447	0	0.0012075	1.58E-08
914	467100	3782260	1.31E-07	0.0028138	0	0.0010158	1.33E-08
915	467150	3782260	1.10E-07	0.0023785	0	0.00085865	1.12E-08
916	467200	3782260	9.28E-08	0.0020011	0	0.00072241	9.46E-09
917	467250	3782260	7.44E-08	0.0016029	0	0.00057864	7.58E-09
918	467300	3782260	5.05E-08	0.0010887	0	0.00039303	5.15E-09
919	467350	3782260	2.52E-08	0.00054353	0	0.00019622	2.57E-09
920	467400	3782260	1.23E-08	0.00026531	0	9.58E-05	1.25E-09
921	467450	3782260	6.10E-09	0.00013156	0	4.75E-05	6.22E-10
922	467500	3782260	7.30E-09	0.00015737	0	5.68E-05	7.44E-10
923	465900	3782310	4.27E-07	0.0091991	0.0014522	0.003321	4.35E-08
924	465950	3782310	4.38E-07	0.0094392	0.0015992	0.0034076	4.46E-08
925	466000	3782310	4.33E-07	0.0093315	0.00084675	0.0033688	4.41E-08
926	466400	3782310	4.22E-07	0.0091079	0	0.003288	4.31E-08
927	467000	3782310	1.74E-07	0.0037418	0	0.0013508	1.77E-08
928	467050	3782310	1.53E-07	0.0033038	0	0.0011927	1.56E-08
929	467100	3782310	1.40E-07	0.0030126	0	0.0010876	1.42E-08
930	467150	3782310	1.21E-07	0.0026108	0	0.00094253	1.23E-08
931	467200	3782310	9.69E-08	0.0020893	0	0.00075424	9.88E-09
932	467250	3782310	8.26E-08	0.0017797	0	0.0006425	8.41E-09
933	467300	3782310	6.37E-08	0.0013735	0	0.00049585	6.49E-09
934	467350	3782310	4.00E-08	0.00086295	0	0.00031153	4.08E-09
935	467400	3782310	2.97E-08	0.00063966	0	0.00023092	3.02E-09
936	467450	3782310	2.22E-08	0.00047926	0	0.00017302	2.27E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
937	467500	3782310	2.25E-08	0.00048586	0	0.0001754	2.30E-09
938	465900	3782360	3.75E-07	0.0080794	0.0013311	0.0029167	3.82E-08
939	465950	3782360	3.79E-07	0.0081664	0.0015568	0.0029482	3.86E-08
940	466000	3782360	3.93E-07	0.008482	0.00045503	0.0030621	4.01E-08
941	466050	3782360	3.89E-07	0.0083752	0.0004249	0.0030235	3.96E-08
942	466400	3782360	3.17E-07	0.0068355	0	0.0024677	3.23E-08
943	466950	3782360	1.66E-07	0.0035781	0	0.0012917	1.69E-08
944	467000	3782360	1.58E-07	0.0034123	0	0.0012319	1.61E-08
945	467050	3782360	1.53E-07	0.0033051	0	0.0011932	1.56E-08
946	467100	3782360	1.39E-07	0.0029907	0	0.0010797	1.41E-08
947	467150	3782360	1.23E-07	0.002652	0	0.0009574	1.25E-08
948	467200	3782360	1.12E-07	0.0024139	0	0.00087144	1.14E-08
949	467250	3782360	8.64E-08	0.0018621	0	0.00067224	8.80E-09
950	467300	3782360	7.10E-08	0.0015295	0	0.00055217	7.23E-09
951	467350	3782360	5.39E-08	0.0011623	0	0.00041961	5.49E-09
952	467400	3782360	3.85E-08	0.00082889	0	0.00029924	3.92E-09
953	467450	3782360	3.74E-08	0.00080692	0	0.00029131	3.81E-09
954	467500	3782360	3.79E-08	0.00081626	0	0.00029468	3.86E-09
955	465900	3782410	3.30E-07	0.007111	0.0012568	0.0025671	3.36E-08
956	465950	3782410	3.36E-07	0.0072538	0.0012423	0.0026187	3.43E-08
957	466000	3782410	3.40E-07	0.0073293	0.00026544	0.0026459	3.46E-08
958	466050	3782410	3.40E-07	0.0073205	0.00039113	0.0026428	3.46E-08
959	466100	3782410	3.44E-07	0.0074098	0.0012584	0.002675	3.50E-08
960	466900	3782410	1.61E-07	0.0034603	0	0.0012492	1.64E-08
961	466950	3782410	1.49E-07	0.0032151	0	0.0011607	1.52E-08
962	467000	3782410	1.57E-07	0.0033746	0	0.0012183	1.60E-08
963	467050	3782410	1.47E-07	0.003167	0	0.0011433	1.50E-08
964	467100	3782410	1.35E-07	0.0029091	0	0.0010502	1.38E-08
965	467150	3782410	1.21E-07	0.0026185	0	0.00094531	1.24E-08
966	467200	3782410	1.08E-07	0.0023381	0	0.00084407	1.11E-08
967	467250	3782410	1.00E-07	0.0021607	0	0.00078002	1.02E-08
968	467300	3782410	7.71E-08	0.0016627	0	0.00060026	7.86E-09
969	467350	3782410	5.81E-08	0.0012519	0	0.00045193	5.92E-09
970	467400	3782410	6.16E-08	0.0013285	0	0.00047959	6.28E-09
971	467450	3782410	5.48E-08	0.0011821	0	0.00042675	5.59E-09
972	467500	3782410	4.74E-08	0.0010217	0	0.00036884	4.83E-09
973	465900	3782460	2.94E-07	0.0063345	0.0012293	0.0022868	2.99E-08
974	465950	3782460	2.96E-07	0.0063837	0.0011316	0.0023046	3.02E-08
975	466000	3782460	3.03E-07	0.0065221	0.00019434	0.0023545	3.08E-08
976	466050	3782460	2.96E-07	0.0063765	0.00050267	0.002302	3.01E-08
977	466100	3782460	3.07E-07	0.0066243	0.00099156	0.0023914	3.13E-08
978	466150	3782460	3.06E-07	0.0066073	0.0010839	0.0023853	3.12E-08
979	466200	3782460	2.98E-07	0.0064224	0.0011899	0.0023185	3.04E-08
980	466250	3782460	2.91E-07	0.0062826	0.0011464	0.0022681	2.97E-08
981	466350	3782460	2.58E-07	0.005571	0.0010506	0.0020112	2.63E-08
982	466850	3782460	1.56E-07	0.0033587	0	0.0012125	1.59E-08
983	466900	3782460	1.45E-07	0.0031288	0	0.0011295	1.48E-08
984	466950	3782460	1.56E-07	0.0033678	0	0.0012158	1.59E-08
985	467000	3782460	1.52E-07	0.003279	0	0.0011838	1.55E-08
986	467050	3782460	1.41E-07	0.0030368	0	0.0010963	1.44E-08
987	467100	3782460	1.31E-07	0.0028152	0	0.0010163	1.33E-08
988	467150	3782460	1.21E-07	0.0026097	0	0.00094213	1.23E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
989	467200	3782460	1.09E-07	0.0023565	0	0.00085072	1.11E-08
990	467250	3782460	9.97E-08	0.0021483	0	0.00077556	1.02E-08
991	467300	3782460	7.96E-08	0.0017152	0	0.0006192	8.11E-09
992	467350	3782460	6.48E-08	0.0013966	0	0.00050418	6.60E-09
993	467400	3782460	7.02E-08	0.0015133	0	0.00054632	7.15E-09
994	467450	3782460	6.13E-08	0.0013216	0	0.00047711	6.25E-09
995	467500	3782460	5.49E-08	0.0011846	0	0.00042764	5.60E-09
996	465700	3780160	2.35E-08	0.00050618	0.00026392	0.00018274	2.39E-09
997	465750	3780160	4.57E-09	9.86E-05	0.00049684	3.56E-05	4.66E-10
998	465800	3780160	-1.33E-08	0	0.0005765	0	-1.51E-09
999	465850	3780160	-3.50E-08	0	0.00017979	0	-4.00E-09
1000	465900	3780160	-5.97E-08	0	0	0	-6.82E-09
1001	465950	3780160	-8.73E-08	0	0	0	-9.97E-09
1002	466000	3780160	-1.17E-07	0	0	0	-1.34E-08
1003	466050	3780160	-1.50E-07	0	0	0	-1.71E-08
1004	466100	3780160	-1.85E-07	0	0	0	-2.11E-08
1005	466150	3780160	-2.22E-07	0	0	0	-2.54E-08
1006	466200	3780160	-2.61E-07	0	0	0	-2.98E-08
1007	466250	3780160	-3.02E-07	0	0	0	-3.45E-08
1008	466300	3780160	-3.43E-07	0	0	0	-3.92E-08
1009	466350	3780160	-3.80E-07	0	0	0	-4.35E-08
1010	466400	3780160	-4.24E-07	0	0	0	-4.84E-08
1011	466450	3780160	-4.66E-07	0	0	0	-5.32E-08
1012	466500	3780160	-5.01E-07	0	0	0	-5.72E-08
1013	466550	3780160	-5.33E-07	0	0	0	-6.09E-08
1014	466600	3780160	-5.61E-07	0	0	0	-6.41E-08
1015	466650	3780160	-5.83E-07	0	0	0	-6.66E-08
1016	466700	3780160	-6.00E-07	0	0	0	-6.86E-08
1017	466750	3780160	-6.11E-07	0	0	0	-6.98E-08
1018	466800	3780160	-6.16E-07	0	0	0	-7.04E-08
1019	466850	3780160	-6.16E-07	0	0	0	-7.04E-08
1020	466900	3780160	-6.11E-07	0	0	0	-6.98E-08
1021	466950	3780160	-6.01E-07	0	0	0	-6.86E-08
1022	467000	3780160	-5.87E-07	0	0	0	-6.71E-08
1023	467050	3780160	-5.70E-07	0	0	0	-6.51E-08
1024	467100	3780160	-5.51E-07	0	0	0	-6.30E-08
1025	467150	3780160	-5.31E-07	0	0	0	-6.06E-08
1026	467200	3780160	-5.08E-07	0	0	0	-5.81E-08
1027	467250	3780160	-4.86E-07	0	0	0	-5.55E-08
1028	467300	3780160	-4.63E-07	0	0	0	-5.29E-08
1029	467350	3780160	-4.40E-07	0	0	0	-5.03E-08
1030	467400	3780160	-4.18E-07	0	0	0	-4.77E-08
1031	467450	3780160	-3.96E-07	0	0	0	-4.52E-08
1032	467500	3780160	-3.75E-07	0	0	0	-4.28E-08
1033	467550	3780160	-3.55E-07	0	0	0	-4.05E-08
1034	467600	3780160	-3.35E-07	0	0	0	-3.83E-08
1035	467650	3780160	-3.17E-07	0	0	0	-3.62E-08
1036	467700	3780160	-3.00E-07	0	0	0	-3.42E-08
1037	465700	3780210	4.16E-08	0.00089701	0.00016276	0.00032383	4.24E-09
1038	465750	3780210	2.34E-08	0.00050536	0.00049539	0.00018244	2.39E-09
1039	465800	3780210	-1.31E-10	0	0.00064753	0	-1.50E-11
1040	465850	3780210	-2.41E-08	0	0.00054552	0	-2.76E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1041	465900	3780210	-5.15E-08	0	0	0	-5.89E-09
1042	465950	3780210	-8.26E-08	0	0	0	-9.44E-09
1043	466000	3780210	-1.17E-07	0	0	0	-1.34E-08
1044	466050	3780210	-1.55E-07	0	0	0	-1.77E-08
1045	466100	3780210	-1.96E-07	0	0	0	-2.23E-08
1046	466150	3780210	-2.39E-07	0	0	0	-2.73E-08
1047	466200	3780210	-2.85E-07	0	0	0	-3.26E-08
1048	466250	3780210	-3.33E-07	0	0	0	-3.81E-08
1049	466300	3780210	-3.79E-07	0	0	0	-4.33E-08
1050	466350	3780210	-4.27E-07	0	0	0	-4.88E-08
1051	466400	3780210	-4.81E-07	0	0	0	-5.49E-08
1052	466450	3780210	-5.30E-07	0	0	0	-6.05E-08
1053	466500	3780210	-5.73E-07	0	0	0	-6.54E-08
1054	466550	3780210	-6.12E-07	0	0	0	-6.99E-08
1055	466600	3780210	-6.45E-07	0	0	0	-7.36E-08
1056	466650	3780210	-6.71E-07	0	0	0	-7.67E-08
1057	466700	3780210	-6.91E-07	0	0	0	-7.89E-08
1058	466750	3780210	-7.03E-07	0	0	0	-8.03E-08
1059	466800	3780210	-7.07E-07	0	0	0	-8.08E-08
1060	466850	3780210	-7.05E-07	0	0	0	-8.06E-08
1061	466900	3780210	-6.97E-07	0	0	0	-7.96E-08
1062	466950	3780210	-6.83E-07	0	0	0	-7.80E-08
1063	467000	3780210	-6.65E-07	0	0	0	-7.60E-08
1064	467050	3780210	-6.43E-07	0	0	0	-7.34E-08
1065	467100	3780210	-6.19E-07	0	0	0	-7.07E-08
1066	467150	3780210	-5.93E-07	0	0	0	-6.78E-08
1067	467200	3780210	-5.66E-07	0	0	0	-6.46E-08
1068	467250	3780210	-5.38E-07	0	0	0	-6.14E-08
1069	467300	3780210	-5.10E-07	0	0	0	-5.83E-08
1070	467350	3780210	-4.83E-07	0	0	0	-5.52E-08
1071	467400	3780210	-4.57E-07	0	0	0	-5.22E-08
1072	467450	3780210	-4.31E-07	0	0	0	-4.92E-08
1073	467500	3780210	-4.07E-07	0	0	0	-4.64E-08
1074	467550	3780210	-3.83E-07	0	0	0	-4.38E-08
1075	467600	3780210	-3.61E-07	0	0	0	-4.12E-08
1076	467650	3780210	-3.40E-07	0	0	0	-3.89E-08
1077	467700	3780210	-3.21E-07	0	0	0	-3.66E-08
1078	465700	3780260	6.43E-08	0.0013864	5.15E-05	0.00050051	6.55E-09
1079	465750	3780260	4.50E-08	0.00096924	0.00042022	0.0003499	4.58E-09
1080	465800	3780260	1.98E-08	0.0004279	0.00070739	0.00015448	2.02E-09
1081	465850	3780260	-9.57E-09	0	0.00070763	0	-1.09E-09
1082	465900	3780260	-3.95E-08	0	0.00035505	0	-4.52E-09
1083	465950	3780260	-7.45E-08	0	0	0	-8.51E-09
1084	466000	3780260	-1.14E-07	0	0	0	-1.31E-08
1085	466050	3780260	-1.58E-07	0	0	0	-1.80E-08
1086	466100	3780260	-2.05E-07	0	0	0	-2.35E-08
1087	466150	3780260	-2.57E-07	0	0	0	-2.93E-08
1088	466200	3780260	-3.11E-07	0	0	0	-3.56E-08
1089	466250	3780260	-3.68E-07	0	0	0	-4.21E-08
1090	466300	3780260	-4.24E-07	0	0	0	-4.84E-08
1091	466350	3780260	-4.83E-07	0	0	0	-5.52E-08
1092	466400	3780260	-5.48E-07	0	0	0	-6.26E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1093	466450	3780260	-6.05E-07	0	0	0	-6.91E-08
1094	466500	3780260	-6.59E-07	0	0	0	-7.53E-08
1095	466550	3780260	-7.07E-07	0	0	0	-8.07E-08
1096	466600	3780260	-7.47E-07	0	0	0	-8.53E-08
1097	466650	3780260	-7.79E-07	0	0	0	-8.89E-08
1098	466700	3780260	-8.01E-07	0	0	0	-9.15E-08
1099	466750	3780260	-8.14E-07	0	0	0	-9.30E-08
1100	466800	3780260	-8.18E-07	0	0	0	-9.35E-08
1101	466850	3780260	-8.13E-07	0	0	0	-9.29E-08
1102	466900	3780260	-8.01E-07	0	0	0	-9.15E-08
1103	466950	3780260	-7.82E-07	0	0	0	-8.93E-08
1104	467000	3780260	-7.56E-07	0	0	0	-8.64E-08
1105	467050	3780260	-7.29E-07	0	0	0	-8.32E-08
1106	467100	3780260	-6.98E-07	0	0	0	-7.97E-08
1107	467150	3780260	-6.65E-07	0	0	0	-7.59E-08
1108	467200	3780260	-6.31E-07	0	0	0	-7.21E-08
1109	467250	3780260	-5.97E-07	0	0	0	-6.82E-08
1110	467300	3780260	-5.64E-07	0	0	0	-6.44E-08
1111	467350	3780260	-5.32E-07	0	0	0	-6.07E-08
1112	467400	3780260	-5.00E-07	0	0	0	-5.71E-08
1113	467450	3780260	-4.70E-07	0	0	0	-5.36E-08
1114	467500	3780260	-4.41E-07	0	0	0	-5.04E-08
1115	467550	3780260	-4.14E-07	0	0	0	-4.73E-08
1116	467600	3780260	-3.89E-07	0	0	0	-4.44E-08
1117	467650	3780260	-3.66E-07	0	0	0	-4.17E-08
1118	467700	3780260	-3.43E-07	0	0	0	-3.92E-08
1119	465700	3780310	9.21E-08	0.0019865	0.00020101	0.00071716	9.39E-09
1120	465750	3780310	7.20E-08	0.0015512	0.0003463	0.00056	7.33E-09
1121	465800	3780310	4.58E-08	0.00098737	0.00068555	0.00035645	4.67E-09
1122	465850	3780310	1.19E-08	0.00025707	0.00082852	9.28E-05	1.22E-09
1123	465900	3780310	-2.28E-08	0	0.00061001	0	-2.61E-09
1124	465950	3780310	-6.22E-08	0	0	0	-7.10E-09
1125	466000	3780310	-1.08E-07	0	0	0	-1.23E-08
1126	466050	3780310	-1.58E-07	0	0	0	-1.81E-08
1127	466100	3780310	-2.14E-07	0	0	0	-2.44E-08
1128	466150	3780310	-2.74E-07	0	0	0	-3.13E-08
1129	466200	3780310	-3.39E-07	0	0	0	-3.88E-08
1130	466250	3780310	-4.06E-07	0	0	0	-4.64E-08
1131	466300	3780310	-4.76E-07	0	0	0	-5.44E-08
1132	466350	3780310	-5.51E-07	0	0	0	-6.29E-08
1133	466400	3780310	-6.29E-07	0	0	0	-7.18E-08
1134	466500	3780310	-7.64E-07	0	0	0	-8.72E-08
1135	466550	3780310	-8.23E-07	0	0	0	-9.40E-08
1136	466600	3780310	-8.72E-07	0	0	0	-9.96E-08
1137	466650	3780310	-9.11E-07	0	0	0	-1.04E-07
1138	466700	3780310	-9.38E-07	0	0	0	-1.07E-07
1139	466750	3780310	-9.52E-07	0	0	0	-1.09E-07
1140	466800	3780310	-9.54E-07	0	0	0	-1.09E-07
1141	466850	3780310	-9.45E-07	0	0	0	-1.08E-07
1142	466900	3780310	-9.26E-07	0	0	0	-1.06E-07
1143	466950	3780310	-8.99E-07	0	0	0	-1.03E-07
1144	467000	3780310	-8.66E-07	0	0	0	-9.89E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1145	467050	3780310	-8.29E-07	0	0	0	-9.47E-08
1146	467100	3780310	-7.89E-07	0	0	0	-9.02E-08
1147	467150	3780310	-7.48E-07	0	0	0	-8.54E-08
1148	467200	3780310	-7.06E-07	0	0	0	-8.06E-08
1149	467250	3780310	-6.64E-07	0	0	0	-7.58E-08
1150	467300	3780310	-6.24E-07	0	0	0	-7.13E-08
1151	467350	3780310	-5.85E-07	0	0	0	-6.68E-08
1152	467400	3780310	-5.47E-07	0	0	0	-6.25E-08
1153	467450	3780310	-5.12E-07	0	0	0	-5.85E-08
1154	467500	3780310	-4.79E-07	0	0	0	-5.47E-08
1155	467550	3780310	-4.48E-07	0	0	0	-5.12E-08
1156	467600	3780310	-4.19E-07	0	0	0	-4.79E-08
1157	467650	3780310	-3.93E-07	0	0	0	-4.49E-08
1158	467700	3780310	-3.68E-07	0	0	0	-4.20E-08
1159	465700	3780360	1.27E-07	0.0027275	0.0003381	0.00098467	1.29E-08
1160	465750	3780360	1.06E-07	0.0022823	0.00025917	0.00082394	1.08E-08
1161	465800	3780360	7.86E-08	0.0016954	0.00068283	0.00061206	8.02E-09
1162	465850	3780360	4.25E-08	0.00091651	0.00088725	0.00033087	4.33E-09
1163	467550	3780360	-4.85E-07	0	0	0	-5.54E-08
1164	467600	3780360	-4.53E-07	0	0	0	-5.17E-08
1165	467650	3780360	-4.23E-07	0	0	0	-4.83E-08
1166	467700	3780360	-3.95E-07	0	0	0	-4.51E-08
1167	465700	3780410	1.68E-07	0.0036295	0.00051256	0.0013103	1.72E-08
1168	465750	3780410	1.49E-07	0.0032167	0.00025455	0.0011613	1.52E-08
1169	465800	3780410	1.20E-07	0.0025954	0.00063138	0.00093698	1.23E-08
1170	465850	3780410	8.23E-08	0.0017734	0.00099287	0.00064022	8.38E-09
1171	467550	3780410	-5.27E-07	0	0	0	-6.02E-08
1172	467600	3780410	-4.90E-07	0	0	0	-5.59E-08
1173	467650	3780410	-4.56E-07	0	0	0	-5.21E-08
1174	467700	3780410	-4.25E-07	0	0	0	-4.85E-08
1175	465700	3780460	2.19E-07	0.0047215	0.00065972	0.0017045	2.23E-08
1176	465750	3780460	2.02E-07	0.0043477	0.00047948	0.0015696	2.06E-08
1177	465800	3780460	1.73E-07	0.0037229	0.00056595	0.001344	1.76E-08
1178	465850	3780460	1.33E-07	0.0028704	0.0010193	0.0010362	1.36E-08
1179	467550	3780460	-5.72E-07	0	0	0	-6.54E-08
1180	467600	3780460	-5.30E-07	0	0	0	-6.06E-08
1181	467650	3780460	-4.92E-07	0	0	0	-5.62E-08
1182	467700	3780460	-4.57E-07	0	0	0	-5.22E-08
1183	465700	3780510	2.80E-07	0.006045	0.00054089	0.0021823	2.86E-08
1184	465750	3780510	2.66E-07	0.0057295	0.00066899	0.0020684	2.71E-08
1185	465800	3780510	2.38E-07	0.0051318	0.00043887	0.0018526	2.43E-08
1186	465850	3780510	1.99E-07	0.0042837	0.0010491	0.0015465	2.03E-08
1187	467550	3780510	-6.23E-07	0	0	0	-7.11E-08
1188	467600	3780510	-5.75E-07	0	0	0	-6.57E-08
1189	467650	3780510	-5.32E-07	0	0	0	-6.07E-08
1190	467700	3780510	-4.93E-07	0	0	0	-5.63E-08
1191	465700	3780560	3.58E-07	0.0077141	0.00029244	0.0027849	3.65E-08
1192	465750	3780560	3.44E-07	0.0074145	0.00046097	0.0026767	3.51E-08
1193	465800	3780560	3.19E-07	0.0068844	0.00037306	0.0024853	3.25E-08
1194	465850	3780560	2.82E-07	0.0060805	0.00091443	0.0021951	2.87E-08
1195	467550	3780560	-6.79E-07	0	0	0	-7.75E-08
1196	467600	3780560	-6.24E-07	0	0	0	-7.13E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1197	467650	3780560	-5.75E-07	0	0	0	-6.57E-08
1198	467700	3780560	-5.31E-07	0	0	0	-6.06E-08
1199	465700	3780610	4.48E-07	0.0096581	0.00021395	0.0034866	4.57E-08
1200	465750	3780610	4.40E-07	0.0094922	0.0004172	0.0034268	4.49E-08
1201	465800	3780610	4.21E-07	0.0090791	0.00032812	0.0032776	4.29E-08
1202	465850	3780610	3.88E-07	0.0083557	0.00028927	0.0030165	3.95E-08
1203	467550	3780610	-7.40E-07	0	0	0	-8.45E-08
1204	467600	3780610	-6.78E-07	0	0	0	-7.74E-08
1205	467650	3780610	-6.21E-07	0	0	0	-7.09E-08
1206	467700	3780610	-5.71E-07	0	0	0	-6.52E-08
1207	465700	3780660	5.55E-07	0.011959	0.00034556	0.0043174	5.65E-08
1208	465750	3780660	5.57E-07	0.012018	0.00063773	0.0043387	5.68E-08
1209	465800	3780660	5.47E-07	0.011789	0.00061855	0.0042559	5.57E-08
1210	465850	3780660	5.21E-07	0.011232	0.00014882	0.004055	5.31E-08
1211	467550	3780660	-8.07E-07	0	0	0	-9.21E-08
1212	467600	3780660	-7.34E-07	0	0	0	-8.39E-08
1213	467650	3780660	-6.70E-07	0	0	0	-7.65E-08
1214	467700	3780660	-6.13E-07	0	0	0	-7.00E-08
1215	465700	3780710	6.82E-07	0.014692	0.0012999	0.005304	6.95E-08
1216	465750	3780710	6.99E-07	0.015063	0.0010436	0.0054378	7.12E-08
1217	465800	3780710	7.03E-07	0.015156	0.0012491	0.0054716	7.17E-08
1218	465850	3780710	6.90E-07	0.014872	0.00090073	0.005369	7.03E-08
1219	467550	3780710	-8.77E-07	0	0	0	-1.00E-07
1220	467600	3780710	-7.93E-07	0	0	0	-9.06E-08
1221	467650	3780710	-7.20E-07	0	0	0	-8.22E-08
1222	467700	3780710	-6.55E-07	0	0	0	-7.48E-08
1223	465700	3780760	8.31E-07	0.017923	0.0021189	0.0064705	8.47E-08
1224	465750	3780760	8.69E-07	0.018733	0.0014	0.0067627	8.86E-08
1225	465800	3780760	8.93E-07	0.019257	0.0016474	0.006952	9.10E-08
1226	465850	3780760	9.02E-07	0.019447	0.0019471	0.0070204	9.19E-08
1227	467550	3780760	-9.48E-07	0	0	0	-1.08E-07
1228	467600	3780760	-8.53E-07	0	0	0	-9.74E-08
1229	467650	3780760	-7.69E-07	0	0	0	-8.79E-08
1230	467700	3780760	-6.97E-07	0	0	0	-7.96E-08
1231	465700	3780810	1.01E-06	0.021713	0.0028337	0.0078385	1.03E-07
1232	465750	3780810	1.07E-06	0.02316	0.0024878	0.0083611	1.09E-07
1233	465800	3780810	1.13E-06	0.024312	0.0016311	0.0087767	1.15E-07
1234	465850	3780810	1.17E-06	0.025193	0.0023738	0.0090948	1.19E-07
1235	467550	3780810	-1.02E-06	0	0	0	-1.16E-07
1236	467600	3780810	-9.09E-07	0	0	0	-1.04E-07
1237	467650	3780810	-8.15E-07	0	0	0	-9.31E-08
1238	467700	3780810	-7.35E-07	0	0	0	-8.39E-08
1239	465700	3780860	1.21E-06	0.026089	0.0030746	0.0094184	1.23E-07
1240	465750	3780860	1.32E-06	0.028409	0.0034414	0.010256	1.34E-07
1241	465800	3780860	1.41E-06	0.030474	0.0028826	0.011001	1.44E-07
1242	465850	3780860	1.50E-06	0.032408	0.0026521	0.0117	1.53E-07
1243	467550	3780860	-1.07E-06	0	0	0	-1.23E-07
1244	467600	3780860	-9.55E-07	0	0	0	-1.09E-07
1245	467650	3780860	-8.52E-07	0	0	0	-9.73E-08
1246	467700	3780860	-7.64E-07	0	0	0	-8.73E-08
1247	465700	3780910	1.44E-06	0.031102	0.0022852	0.011228	1.47E-07
1248	465750	3780910	1.60E-06	0.034458	0.0034547	0.01244	1.63E-07

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1249	465800	3780910	1.76E-06	0.037968	0.0038079	0.013707	1.79E-07
1250	465850	3780910	1.92E-06	0.0413	0.0029407	0.01491	1.95E-07
1251	467550	3780910	-1.12E-06	0	0	0	-1.27E-07
1252	467600	3780910	-9.86E-07	0	0	0	-1.13E-07
1253	467650	3780910	-8.75E-07	0	0	0	-1.00E-07
1254	467700	3780910	-7.82E-07	0	0	0	-8.93E-08
1255	465700	3780960	1.72E-06	0.036996	0.00078338	0.013356	1.75E-07
1256	465750	3780960	1.93E-06	0.041514	0.0023916	0.014987	1.96E-07
1257	465800	3780960	2.17E-06	0.04684	0.003702	0.01691	2.21E-07
1258	465850	3780960	2.42E-06	0.052251	0.00379	0.018863	2.47E-07
1259	467550	3780960	-1.13E-06	0	0	0	-1.29E-07
1260	467600	3780960	-9.93E-07	0	0	0	-1.13E-07
1261	467650	3780960	-8.79E-07	0	0	0	-1.00E-07
1262	467700	3780960	-7.83E-07	0	0	0	-8.94E-08
1263	465700	3781010	2.01E-06	0.043296	0.00088185	0.01563	2.05E-07
1264	465750	3781010	2.32E-06	0.0501	0.0013417	0.018087	2.37E-07
1265	465800	3781010	2.68E-06	0.057688	0.0034393	0.020826	2.73E-07
1266	465850	3781010	3.05E-06	0.065787	0.0050609	0.02375	3.11E-07
1267	467550	3781010	-1.11E-06	0	0	0	-1.26E-07
1268	467600	3781010	-9.73E-07	0	0	0	-1.11E-07
1269	467650	3781010	-8.59E-07	0	0	0	-9.82E-08
1270	467700	3781010	-7.64E-07	0	0	0	-8.72E-08
1271	465700	3781060	2.32E-06	0.050047	0.001366	0.018067	2.37E-07
1272	465750	3781060	2.74E-06	0.059131	0.0015994	0.021347	2.80E-07
1273	465800	3781060	3.24E-06	0.069855	0.0026171	0.025218	3.30E-07
1274	465850	3781060	3.80E-06	0.081956	0.0059896	0.029587	3.87E-07
1275	467550	3781060	-1.05E-06	0	0	0	-1.20E-07
1276	467600	3781060	-9.23E-07	0	0	0	-1.05E-07
1277	467650	3781060	-8.16E-07	0	0	0	-9.32E-08
1278	467700	3781060	-7.26E-07	0	0	0	-8.29E-08
1279	465700	3781110	2.63E-06	0.056723	0.0034109	0.020477	2.68E-07
1280	465750	3781110	3.18E-06	0.068546	0.0028541	0.024746	3.24E-07
1281	465800	3781110	3.85E-06	0.083064	0.0024002	0.029987	3.93E-07
1282	465850	3781110	4.70E-06	0.10139	0.0038918	0.036602	4.79E-07
1283	467550	3781110	-9.64E-07	0	0	0	-1.10E-07
1284	467600	3781110	-8.50E-07	0	0	0	-9.70E-08
1285	467650	3781110	-7.53E-07	0	0	0	-8.60E-08
1286	467700	3781110	-6.71E-07	0	0	0	-7.67E-08
1287	465700	3781160	2.91E-06	0.062691	0.0047083	0.022632	2.96E-07
1288	465750	3781160	3.60E-06	0.077548	0.0057443	0.027995	3.67E-07
1289	465800	3781160	4.50E-06	0.097083	0.0060402	0.035048	4.59E-07
1290	465850	3781160	5.68E-06	0.12255	0.0053788	0.044241	5.79E-07
1291	467550	3781160	-8.61E-07	0	0	0	-9.83E-08
1292	467600	3781160	-7.62E-07	0	0	0	-8.70E-08
1293	467650	3781160	-6.78E-07	0	0	0	-7.75E-08
1294	467700	3781160	-6.06E-07	0	0	0	-6.93E-08
1295	465700	3781210	3.14E-06	0.067798	0.0030484	0.024476	3.21E-07
1296	465750	3781210	3.97E-06	0.085521	0.0054599	0.030874	4.04E-07
1297	465800	3781210	5.10E-06	0.11002	0.0081192	0.039719	5.20E-07
1298	465850	3781210	6.70E-06	0.14434	0.010629	0.052109	6.82E-07
1299	467550	3781210	-7.54E-07	0	0	0	-8.61E-08
1300	467600	3781210	-6.71E-07	0	0	0	-7.66E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1301	467650	3781210	-6.00E-07	0	0	0	-6.85E-08
1302	467700	3781210	-5.39E-07	0	0	0	-6.15E-08
1303	465700	3781260	3.32E-06	0.071675	0.0011773	0.025875	3.39E-07
1304	465750	3781260	4.25E-06	0.091641	0.0018239	0.033083	4.33E-07
1305	465800	3781260	5.60E-06	0.12064	0.0044498	0.043553	5.70E-07
1306	465850	3781260	7.56E-06	0.16289	0.0086033	0.058804	7.70E-07
1307	467550	3781260	-6.54E-07	0	0	0	-7.47E-08
1308	467600	3781260	-5.85E-07	0	0	0	-6.68E-08
1309	467650	3781260	-5.25E-07	0	0	0	-6.00E-08
1310	467700	3781260	-4.74E-07	0	0	0	-5.41E-08
1311	465700	3781310	3.45E-06	0.074335	0.0051949	0.026836	3.51E-07
1312	465750	3781310	4.42E-06	0.095383	0.0064958	0.034434	4.51E-07
1313	465800	3781310	5.91E-06	0.12731	0.0081508	0.045961	6.02E-07
1314	465850	3781310	8.12E-06	0.17502	0.010481	0.063182	8.27E-07
1315	467550	3781310	-5.67E-07	0	0	0	-6.47E-08
1316	467600	3781310	-5.09E-07	0	0	0	-5.81E-08
1317	467650	3781310	-4.59E-07	0	0	0	-5.24E-08
1318	467700	3781310	-4.16E-07	0	0	0	-4.75E-08
1319	465700	3781360	3.31E-06	0.071449	0.0042682	0.025794	3.38E-07
1320	465750	3781360	4.37E-06	0.09412	0.005718	0.033978	4.45E-07
1321	465800	3781360	5.97E-06	0.12877	0.0074157	0.046488	6.09E-07
1322	465850	3781360	8.26E-06	0.17801	0.009894	0.064265	8.42E-07
1323	467550	3781360	-4.95E-07	0	0	0	-5.65E-08
1324	467600	3781360	-4.46E-07	0	0	0	-5.09E-08
1325	467650	3781360	-4.04E-07	0	0	0	-4.61E-08
1326	467700	3781360	-3.67E-07	0	0	0	-4.19E-08
1327	465700	3781410	3.07E-06	0.066247	0.0029392	0.023916	3.13E-07
1328	465750	3781410	4.10E-06	0.0884	0.0041829	0.031913	4.18E-07
1329	465800	3781410	5.81E-06	0.12524	0.0058901	0.045214	5.92E-07
1330	465850	3781410	7.91E-06	0.17062	0.0086985	0.061594	8.07E-07
1331	467550	3781410	-4.36E-07	0	0	0	-4.98E-08
1332	467600	3781410	-3.95E-07	0	0	0	-4.51E-08
1333	467650	3781410	-3.59E-07	0	0	0	-4.10E-08
1334	467700	3781410	-3.27E-07	0	0	0	-3.73E-08
1335	465700	3781460	2.77E-06	0.059712	0.0026858	0.021557	2.82E-07
1336	465750	3781460	3.88E-06	0.083687	0.0038653	0.030212	3.96E-07
1337	465800	3781460	5.34E-06	0.11509	0.0049932	0.041547	5.44E-07
1338	465850	3781460	7.14E-06	0.15397	0.0054737	0.055584	7.28E-07
1339	467550	3781460	-3.91E-07	0	0	0	-4.46E-08
1340	467600	3781460	-3.54E-07	0	0	0	-4.04E-08
1341	467650	3781460	-3.23E-07	0	0	0	-3.69E-08
1342	467700	3781460	-2.95E-07	0	0	0	-3.36E-08
1343	465700	3781510	2.62E-06	0.056526	0.0013241	0.020406	2.67E-07
1344	465750	3781510	3.47E-06	0.074824	0.001251	0.027012	3.54E-07
1345	465800	3781510	4.77E-06	0.10279	0.0029627	0.03711	4.86E-07
1346	465850	3781510	6.21E-06	0.13391	0.004961	0.048344	6.33E-07
1347	467550	3781510	-3.55E-07	0	0	0	-4.05E-08
1348	467600	3781510	-3.21E-07	0	0	0	-3.67E-08
1349	467650	3781510	-2.93E-07	0	0	0	-3.35E-08
1350	467700	3781510	-2.69E-07	0	0	0	-3.08E-08
1351	465700	3781560	2.45E-06	0.05284	0.0011988	0.019076	2.50E-07
1352	465750	3781560	3.22E-06	0.069495	0.0016958	0.025088	3.29E-07

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1353	465800	3781560	4.15E-06	0.089526	0.0025974	0.03232	4.23E-07
1354	465850	3781560	5.32E-06	0.11476	0.0032148	0.04143	5.43E-07
1355	467600	3781560	-2.97E-07	0	0	0	-3.39E-08
1356	467650	3781560	-2.70E-07	0	0	0	-3.08E-08
1357	467700	3781560	-2.48E-07	0	0	0	-2.84E-08
1358	465700	3781610	2.26E-06	0.048756	0.0019245	0.017601	2.30E-07
1359	465750	3781610	2.86E-06	0.061634	0.0018801	0.02225	2.91E-07
1360	465800	3781610	3.54E-06	0.076283	0.0021518	0.027539	3.61E-07
1361	465850	3781610	4.40E-06	0.094753	0.0021467	0.034207	4.48E-07
1362	467550	3781610	-2.96E-07	0	0	0	-3.38E-08
1363	467600	3781610	-2.71E-07	0	0	0	-3.10E-08
1364	467650	3781610	-2.52E-07	0	0	0	-2.88E-08
1365	467700	3781610	-2.30E-07	0	0	0	-2.63E-08
1366	465700	3781660	2.08E-06	0.04491	0.0017886	0.016213	2.12E-07
1367	465750	3781660	2.52E-06	0.054351	0.0018444	0.019621	2.57E-07
1368	465800	3781660	3.07E-06	0.066258	0.0017893	0.02392	3.13E-07
1369	465850	3781660	3.66E-06	0.078927	0.0025235	0.028493	3.73E-07
1370	467550	3781660	-2.63E-07	0	0	0	-3.00E-08
1371	467600	3781660	-2.52E-07	0	0	0	-2.88E-08
1372	467650	3781660	-2.32E-07	0	0	0	-2.65E-08
1373	467700	3781660	-2.17E-07	0	0	0	-2.48E-08
1374	465700	3781710	1.87E-06	0.04028	0.0015543	0.014541	1.90E-07
1375	465750	3781710	2.21E-06	0.047743	0.001809	0.017236	2.26E-07
1376	465800	3781710	2.64E-06	0.056938	0.0021517	0.020555	2.69E-07
1377	465850	3781710	3.07E-06	0.066156	0.0026513	0.023883	3.13E-07
1378	467550	3781710	-2.51E-07	0	0	0	-2.87E-08
1379	467600	3781710	-2.33E-07	0	0	0	-2.66E-08
1380	467650	3781710	-2.16E-07	0	0	0	-2.47E-08
1381	467700	3781710	-2.01E-07	0	0	0	-2.30E-08
1382	465700	3781760	1.66E-06	0.035747	0.0017131	0.012905	1.69E-07
1383	465750	3781760	1.95E-06	0.041999	0.002175	0.015162	1.99E-07
1384	465800	3781760	2.23E-06	0.047999	0.0023304	0.017328	2.27E-07
1385	465850	3781760	2.56E-06	0.055256	0.0026285	0.019948	2.61E-07
1386	467550	3781760	-2.30E-07	0	0	0	-2.62E-08
1387	467600	3781760	-2.07E-07	0	0	0	-2.37E-08
1388	467650	3781760	-1.94E-07	0	0	0	-2.22E-08
1389	467700	3781760	-1.82E-07	0	0	0	-2.08E-08
1390	465700	3781810	1.49E-06	0.032206	0.0020623	0.011627	1.52E-07
1391	465750	3781810	1.70E-06	0.036729	0.0018171	0.01326	1.74E-07
1392	465800	3781810	1.91E-06	0.041197	0.0026105	0.014873	1.95E-07
1393	465850	3781810	2.16E-06	0.04647	0.0018115	0.016776	2.20E-07
1394	467550	3781810	-1.87E-07	0	0	0	-2.14E-08
1395	467600	3781810	-1.76E-07	0	0	0	-2.01E-08
1396	467650	3781810	-1.69E-07	0	0	0	-1.93E-08
1397	467700	3781810	-1.60E-07	0	0	0	-1.82E-08
1398	465700	3781860	1.32E-06	0.028453	0.0019729	0.010272	1.35E-07
1399	465750	3781860	1.49E-06	0.032055	0.0021305	0.011572	1.52E-07
1400	465800	3781860	1.65E-06	0.03553	0.0017833	0.012827	1.68E-07
1401	465850	3781860	1.82E-06	0.03931	0.0017151	0.014191	1.86E-07
1402	467550	3781860	-1.50E-07	0	0	0	-1.71E-08
1403	467600	3781860	-1.46E-07	0	0	0	-1.67E-08
1404	467650	3781860	-1.47E-07	0	0	0	-1.68E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1405	467700	3781860	-1.41E-07	0	0	0	-1.62E-08
1406	465700	3781910	1.16E-06	0.02497	0.0020614	0.0090143	1.18E-07
1407	465750	3781910	1.28E-06	0.027569	0.0018752	0.0099525	1.30E-07
1408	465800	3781910	1.40E-06	0.030199	0.0021467	0.010902	1.43E-07
1409	465850	3781910	1.53E-06	0.032945	0.0020263	0.011893	1.56E-07
1410	467550	3781910	-1.18E-07	0	0	0	-1.34E-08
1411	467600	3781910	-1.36E-07	0	0	0	-1.55E-08
1412	467650	3781910	-1.33E-07	0	0	0	-1.52E-08
1413	467700	3781910	-1.23E-07	0	0	0	-1.41E-08
1414	465700	3781960	1.02E-06	0.02195	0.0017292	0.0079241	1.04E-07
1415	465750	3781960	1.10E-06	0.023643	0.0020306	0.0085354	1.12E-07
1416	465800	3781960	1.20E-06	0.025795	0.0019458	0.0093122	1.22E-07
1417	465850	3781960	1.28E-06	0.027603	0.0017487	0.0099648	1.30E-07
1418	467550	3781960	-1.02E-07	0	0	0	-1.17E-08
1419	467600	3781960	-9.84E-08	0	0	0	-1.12E-08
1420	467650	3781960	-9.59E-08	0	0	0	-1.10E-08
1421	467700	3781960	-1.03E-07	0	0	0	-1.18E-08
1422	465700	3782010	8.81E-07	0.018994	0.0018658	0.0068571	8.98E-08
1423	465750	3782010	9.30E-07	0.020054	0.0023155	0.0072397	9.48E-08
1424	465800	3782010	1.01E-06	0.021756	0.0017632	0.0078542	1.03E-07
1425	465850	3782010	1.07E-06	0.023144	0.0015156	0.0083553	1.09E-07
1426	467550	3782010	-8.63E-08	0	0	0	-9.86E-09
1427	467600	3782010	-8.57E-08	0	0	0	-9.79E-09
1428	467650	3782010	-8.82E-08	0	0	0	-1.01E-08
1429	467700	3782010	-8.82E-08	0	0	0	-1.01E-08
1430	465700	3782060	7.66E-07	0.016522	0.0021636	0.0059646	7.81E-08
1431	465750	3782060	8.14E-07	0.017539	0.0013358	0.0063318	8.29E-08
1432	465800	3782060	8.53E-07	0.018391	0.0017919	0.0066395	8.69E-08
1433	465850	3782060	8.67E-07	0.018684	0.0019328	0.0067452	8.83E-08
1434	467550	3782060	-7.62E-08	0	0	0	-8.70E-09
1435	467600	3782060	-7.45E-08	0	0	0	-8.51E-09
1436	467650	3782060	-7.39E-08	0	0	0	-8.44E-09
1437	467700	3782060	-7.37E-08	0	0	0	-8.42E-09
1438	465700	3782110	6.62E-07	0.014279	0.0016774	0.0051548	6.75E-08
1439	465750	3782110	7.02E-07	0.015144	0.0015676	0.005467	7.16E-08
1440	465800	3782110	7.32E-07	0.015778	0.0015922	0.0056959	7.46E-08
1441	465850	3782110	7.32E-07	0.015771	0.0020844	0.0056934	7.46E-08
1442	467550	3782110	-5.59E-08	0	0	0	-6.39E-09
1443	467600	3782110	-5.97E-08	0	0	0	-6.82E-09
1444	467650	3782110	-5.31E-08	0	0	0	-6.07E-09
1445	467700	3782110	-4.27E-08	0	0	0	-4.88E-09
1446	465700	3782160	5.74E-07	0.012382	0.0011671	0.0044701	5.85E-08
1447	465750	3782160	6.06E-07	0.013058	0.0017537	0.0047139	6.17E-08
1448	465800	3782160	6.16E-07	0.013277	0.0018589	0.0047932	6.28E-08
1449	465850	3782160	6.34E-07	0.013666	0.0014608	0.0049335	6.46E-08
1450	467550	3782160	-2.49E-08	0	0	0	-2.84E-09
1451	467600	3782160	-2.17E-08	0	0	0	-2.48E-09
1452	467650	3782160	-2.59E-08	0	0	0	-2.96E-09
1453	467700	3782160	-2.10E-08	0	0	0	-2.40E-09
1454	465700	3782210	5.09E-07	0.010971	0.0015312	0.0039606	5.19E-08
1455	465750	3782210	5.28E-07	0.011372	0.0016219	0.0041054	5.38E-08
1456	465800	3782210	5.38E-07	0.011605	0.0017763	0.0041894	5.49E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1457	465850	3782210	5.46E-07	0.011767	0.00092225	0.0042479	5.56E-08
1458	467550	3782210	-8.53E-09	0	0	0	-9.74E-10
1459	467600	3782210	-1.44E-08	0	0	0	-1.64E-09
1460	467650	3782210	-1.75E-08	0	0	0	-2.00E-09
1461	467700	3782210	-1.21E-08	0	0	0	-1.39E-09
1462	465700	3782260	4.46E-07	0.0096073	0.0017172	0.0034683	4.54E-08
1463	465750	3782260	4.57E-07	0.0098577	0.0016316	0.0035587	4.66E-08
1464	465800	3782260	4.64E-07	0.0099992	0.001448	0.0036098	4.73E-08
1465	465850	3782260	4.79E-07	0.010327	0.0011266	0.0037282	4.88E-08
1466	467550	3782260	2.46E-09	5.30E-05	0	1.91E-05	2.51E-10
1467	467600	3782260	-2.69E-09	0	0	0	-3.07E-10
1468	467650	3782260	2.15E-09	4.64E-05	0	1.68E-05	2.19E-10
1469	467700	3782260	2.03E-09	4.37E-05	0	1.58E-05	2.06E-10
1470	465700	3782310	3.87E-07	0.0083516	0.0017376	0.003015	3.95E-08
1471	465750	3782310	4.01E-07	0.008643	0.001504	0.0031202	4.09E-08
1472	465800	3782310	4.07E-07	0.0087698	0.0011315	0.003166	4.15E-08
1473	465850	3782310	4.16E-07	0.0089703	0.0013039	0.0032384	4.24E-08
1474	467550	3782310	1.61E-08	0.00034798	0	0.00012562	1.65E-09
1475	467600	3782310	9.21E-09	0.00019857	0	7.17E-05	9.39E-10
1476	467650	3782310	1.91E-08	0.00041225	0	0.00014883	1.95E-09
1477	467700	3782310	-1.34E-08	0	0	0	-1.53E-09
1478	465700	3782360	3.40E-07	0.0073277	0.0012716	0.0026453	3.46E-08
1479	465750	3782360	3.51E-07	0.0075658	0.001442	0.0027313	3.58E-08
1480	465800	3782360	3.56E-07	0.0076836	0.00083999	0.0027738	3.63E-08
1481	465850	3782360	3.68E-07	0.007925	0.0012882	0.002861	3.75E-08
1482	467550	3782360	3.00E-08	0.00064653	0	0.0002334	3.06E-09
1483	467600	3782360	2.29E-08	0.00049437	0	0.00017847	2.34E-09
1484	467650	3782360	1.17E-08	0.00025323	0	9.14E-05	1.20E-09
1485	467700	3782360	1.67E-08	0.00035924	0	0.00012969	1.70E-09
1486	465700	3782410	3.02E-07	0.0065021	0.0013739	0.0023473	3.07E-08
1487	465750	3782410	3.12E-07	0.0067265	0.0012491	0.0024283	3.18E-08
1488	465800	3782410	3.18E-07	0.0068454	0.0005707	0.0024712	3.24E-08
1489	465850	3782410	3.24E-07	0.0069745	0.0013349	0.0025178	3.30E-08
1490	467550	3782410	3.61E-08	0.00077726	0	0.0002806	3.67E-09
1491	467600	3782410	3.07E-08	0.00066245	0	0.00023915	3.13E-09
1492	467650	3782410	2.87E-08	0.00061851	0	0.00022329	2.92E-09
1493	467700	3782410	2.26E-08	0.00048778	0	0.00017609	2.31E-09
1494	465700	3782460	2.69E-07	0.0058014	0.001487	0.0020944	2.74E-08
1495	465750	3782460	2.76E-07	0.005958	0.00091657	0.0021509	2.82E-08
1496	465800	3782460	2.82E-07	0.0060805	0.00072122	0.0021951	2.87E-08
1497	465850	3782460	2.89E-07	0.0062214	0.0014779	0.002246	2.94E-08
1498	467550	3782460	4.85E-08	0.0010459	0	0.00037757	4.94E-09
1499	467600	3782460	2.59E-08	0.00055754	0	0.00020128	2.64E-09
1500	467650	3782460	3.40E-08	0.00073194	0	0.00026424	3.46E-09
1501	467700	3782460	2.73E-08	0.00058748	0	0.00021208	2.78E-09
1502	465700	3782510	2.42E-07	0.0052183	0.0012422	0.0018839	2.47E-08
1503	465750	3782510	2.47E-07	0.0053282	0.00050135	0.0019235	2.52E-08
1504	465800	3782510	2.53E-07	0.0054474	0.0009937	0.0019666	2.58E-08
1505	465850	3782510	2.59E-07	0.005579	0.0013263	0.0020141	2.64E-08
1506	465900	3782510	2.62E-07	0.0056506	0.001154	0.0020399	2.67E-08
1507	465950	3782510	2.64E-07	0.0056894	0.00099585	0.0020539	2.69E-08
1508	466000	3782510	2.69E-07	0.0058064	0.00013411	0.0020962	2.75E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1509	466050	3782510	2.67E-07	0.0057523	0.00066971	0.0020766	2.72E-08
1510	466100	3782510	2.69E-07	0.0058097	0.00094258	0.0020973	2.75E-08
1511	466150	3782510	2.69E-07	0.0058086	0.0011063	0.0020969	2.75E-08
1512	466200	3782510	2.65E-07	0.005716	0.0014218	0.0020635	2.70E-08
1513	466250	3782510	2.64E-07	0.0056954	0.0008304	0.0020561	2.69E-08
1514	466300	3782510	2.65E-07	0.0057023	0.00043744	0.0020586	2.70E-08
1515	466350	3782510	2.43E-07	0.0052365	0.00077749	0.0018904	2.48E-08
1516	466850	3782510	1.42E-07	0.0030544	0	0.0011027	1.44E-08
1517	466900	3782510	1.47E-07	0.0031747	0	0.0011461	1.50E-08
1518	466950	3782510	1.56E-07	0.003359	0	0.0012126	1.59E-08
1519	467000	3782510	1.44E-07	0.0031107	0	0.001123	1.47E-08
1520	467050	3782510	1.35E-07	0.0029033	0	0.0010481	1.37E-08
1521	467100	3782510	1.26E-07	0.0027144	0	0.00097991	1.28E-08
1522	467150	3782510	1.18E-07	0.0025347	0	0.00091506	1.20E-08
1523	467200	3782510	1.09E-07	0.0023419	0	0.00084546	1.11E-08
1524	467250	3782510	1.00E-07	0.0021612	0	0.00078022	1.02E-08
1525	467300	3782510	8.62E-08	0.0018577	0	0.00067066	8.78E-09
1526	467350	3782510	7.87E-08	0.0016971	0	0.00061265	8.02E-09
1527	467400	3782510	7.13E-08	0.0015378	0	0.00055515	7.27E-09
1528	467450	3782510	6.28E-08	0.001354	0	0.00048881	6.40E-09
1529	467500	3782510	5.53E-08	0.001192	0	0.00043032	5.64E-09
1530	467550	3782510	5.09E-08	0.0010975	0	0.00039621	5.19E-09
1531	467600	3782510	4.78E-08	0.0010299	0	0.00037182	4.87E-09
1532	467650	3782510	4.11E-08	0.0008852	0	0.00031956	4.18E-09
1533	467700	3782510	3.40E-08	0.00073249	0	0.00026444	3.46E-09
1534	465700	3782560	2.20E-07	0.0047361	0.00094693	0.0017098	2.24E-08
1535	465750	3782560	2.23E-07	0.0048053	0.00013184	0.0017347	2.27E-08
1536	465800	3782560	2.29E-07	0.0049462	0.0012284	0.0017856	2.34E-08
1537	465850	3782560	2.33E-07	0.005028	0.0010181	0.0018152	2.38E-08
1538	465900	3782560	2.38E-07	0.0051299	0.0011519	0.0018519	2.43E-08
1539	465950	3782560	2.39E-07	0.0051609	0.00069478	0.0018631	2.44E-08
1540	466000	3782560	2.40E-07	0.0051755	0.00014221	0.0018684	2.45E-08
1541	466050	3782560	2.41E-07	0.0051912	0.00046731	0.0018741	2.45E-08
1542	466100	3782560	2.41E-07	0.0051851	0.00096628	0.0018719	2.45E-08
1543	466150	3782560	2.39E-07	0.0051618	0.0012026	0.0018634	2.44E-08
1544	466200	3782560	2.39E-07	0.0051596	0.0013687	0.0018627	2.44E-08
1545	466250	3782560	2.43E-07	0.0052466	0.00052772	0.0018941	2.48E-08
1546	466300	3782560	2.10E-07	0.004532	0.00080202	0.0016361	2.14E-08
1547	466350	3782560	2.18E-07	0.0047094	0.00065471	0.0017001	2.23E-08
1548	466400	3782560	2.16E-07	0.0046468	5.54E-05	0.0016775	2.20E-08
1549	466450	3782560	2.04E-07	0.0044079	0	0.0015913	2.08E-08
1550	466500	3782560	1.93E-07	0.0041511	0.00021556	0.0014986	1.96E-08
1551	466800	3782560	1.36E-07	0.0029215	0	0.0010547	1.38E-08
1552	466850	3782560	1.34E-07	0.0028816	0	0.0010403	1.36E-08
1553	466900	3782560	1.57E-07	0.0033826	0	0.0012211	1.60E-08
1554	466950	3782560	1.46E-07	0.003139	0	0.0011332	1.48E-08
1555	467000	3782560	1.37E-07	0.0029572	0	0.0010676	1.40E-08
1556	467050	3782560	1.29E-07	0.0027764	0	0.0010023	1.31E-08
1557	467100	3782560	1.21E-07	0.0026105	0	0.00094243	1.23E-08
1558	467150	3782560	1.13E-07	0.0024427	0	0.00088185	1.15E-08
1559	467200	3782560	1.06E-07	0.0022843	0	0.00082464	1.08E-08
1560	467250	3782560	9.80E-08	0.0021129	0	0.00076277	9.99E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1561	467300	3782560	8.49E-08	0.0018294	0	0.00066045	8.65E-09
1562	467350	3782560	8.13E-08	0.0017523	0	0.00063258	8.28E-09
1563	467400	3782560	7.20E-08	0.0015529	0	0.0005606	7.34E-09
1564	467450	3782560	6.40E-08	0.0013804	0	0.00049833	6.53E-09
1565	467500	3782560	6.00E-08	0.0012936	0	0.000467	6.12E-09
1566	467550	3782560	5.64E-08	0.0012159	0	0.00043894	5.75E-09
1567	467600	3782560	5.20E-08	0.00112	0	0.00040434	5.29E-09
1568	467650	3782560	4.48E-08	0.00096649	0	0.00034891	4.57E-09
1569	467700	3782560	3.71E-08	0.00079978	0	0.00028873	3.78E-09
1570	465700	3782610	2.00E-07	0.0043169	0.00060507	0.0015585	2.04E-08
1571	465750	3782610	2.03E-07	0.0043823	0.00055421	0.0015821	2.07E-08
1572	465800	3782610	2.09E-07	0.0045015	0.0012167	0.0016251	2.13E-08
1573	465850	3782610	2.13E-07	0.0045919	0.00085159	0.0016577	2.17E-08
1574	465900	3782610	2.16E-07	0.0046515	0.0011426	0.0016792	2.20E-08
1575	465950	3782610	2.15E-07	0.0046292	0.00043887	0.0016712	2.19E-08
1576	466000	3782610	2.15E-07	0.0046394	0.0002636	0.0016749	2.19E-08
1577	466050	3782610	2.16E-07	0.0046528	0.00039711	0.0016797	2.20E-08
1578	466100	3782610	2.16E-07	0.0046605	0.0009218	0.0016825	2.20E-08
1579	466150	3782610	2.18E-07	0.0047102	0.0013054	0.0017004	2.23E-08
1580	466200	3782610	2.19E-07	0.0047138	0.0012434	0.0017017	2.23E-08
1581	466250	3782610	1.94E-07	0.004187	0.00094261	0.0015116	1.98E-08
1582	466300	3782610	1.99E-07	0.0042974	0.00058007	0.0015514	2.03E-08
1583	466350	3782610	1.93E-07	0.0041706	0.00065408	0.0015056	1.97E-08
1584	466400	3782610	1.84E-07	0.0039681	0.00031564	0.0014325	1.88E-08
1585	466450	3782610	1.82E-07	0.0039333	0	0.0014199	1.86E-08
1586	466500	3782610	1.74E-07	0.0037591	4.90E-05	0.0013571	1.78E-08
1587	466550	3782610	1.65E-07	0.0035556	0.00033529	0.0012836	1.68E-08
1588	466600	3782610	1.53E-07	0.0033082	0	0.0011943	1.56E-08
1589	466650	3782610	1.43E-07	0.0030851	0	0.0011138	1.46E-08
1590	466750	3782610	1.28E-07	0.0027698	0	0.00099994	1.31E-08
1591	466800	3782610	1.24E-07	0.0026756	0	0.00096593	1.26E-08
1592	466850	3782610	1.51E-07	0.0032455	0	0.0011717	1.53E-08
1593	466900	3782610	1.45E-07	0.0031261	0	0.0011285	1.48E-08
1594	466950	3782610	1.34E-07	0.0028981	0	0.0010462	1.37E-08
1595	467000	3782610	1.28E-07	0.0027597	0	0.00099627	1.30E-08
1596	467050	3782610	1.23E-07	0.0026501	0	0.00095671	1.25E-08
1597	467100	3782610	1.16E-07	0.0025015	0	0.00090307	1.18E-08
1598	467150	3782610	1.09E-07	0.002359	0	0.00085161	1.12E-08
1599	467200	3782610	1.06E-07	0.0022895	0	0.00082652	1.08E-08
1600	467250	3782610	9.60E-08	0.0020695	0	0.0007471	9.78E-09
1601	467300	3782610	8.95E-08	0.0019302	0	0.00069683	9.13E-09
1602	467350	3782610	8.15E-08	0.0017572	0	0.00063437	8.31E-09
1603	467400	3782610	7.42E-08	0.0016001	0	0.00057765	7.56E-09
1604	467450	3782610	6.54E-08	0.0014106	0	0.00050924	6.67E-09
1605	467500	3782610	6.25E-08	0.0013469	0	0.00048624	6.37E-09
1606	467550	3782610	5.27E-08	0.001136	0	0.00041009	5.37E-09
1607	467600	3782610	4.84E-08	0.0010431	0	0.00037658	4.93E-09
1608	467650	3782610	3.84E-08	0.00082807	0	0.00029894	3.91E-09
1609	467700	3782610	4.29E-08	0.00092475	0	0.00033384	4.37E-09
1610	465700	3782660	1.83E-07	0.0039456	0.00034579	0.0014244	1.87E-08
1611	465750	3782660	1.87E-07	0.0040335	0.00077666	0.0014561	1.91E-08
1612	465800	3782660	1.92E-07	0.0041299	0.0010435	0.0014909	1.95E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1613	465850	3782660	1.94E-07	0.0041854	0.00093954	0.001511	1.98E-08
1614	465900	3782660	1.94E-07	0.0041821	0.0010339	0.0015098	1.98E-08
1615	465950	3782660	1.93E-07	0.0041686	0.00024928	0.0015049	1.97E-08
1616	466000	3782660	1.93E-07	0.004167	0.00013007	0.0015043	1.97E-08
1617	466050	3782660	1.95E-07	0.0042032	0.00042406	0.0015174	1.99E-08
1618	466100	3782660	1.96E-07	0.0042238	0.00094917	0.0015248	2.00E-08
1619	466150	3782660	1.95E-07	0.0042126	0.0014202	0.0015208	1.99E-08
1620	466200	3782660	1.89E-07	0.0040684	0.0011811	0.0014687	1.92E-08
1621	466250	3782660	1.88E-07	0.0040522	0.00056559	0.0014629	1.92E-08
1622	466300	3782660	1.84E-07	0.003972	0.00050029	0.0014339	1.88E-08
1623	466350	3782660	1.79E-07	0.003852	0.00058282	0.0013906	1.82E-08
1624	466400	3782660	1.72E-07	0.0037037	0.00039258	0.0013371	1.75E-08
1625	466450	3782660	1.63E-07	0.0035221	0.00019104	0.0012715	1.67E-08
1626	466500	3782660	1.54E-07	0.0033274	0	0.0012012	1.57E-08
1627	466550	3782660	1.44E-07	0.0031107	0.00030422	0.001123	1.47E-08
1628	466600	3782660	1.37E-07	0.0029464	0	0.0010637	1.39E-08
1629	466650	3782660	1.28E-07	0.0027652	0	0.00099825	1.31E-08
1630	466700	3782660	1.23E-07	0.0026441	0	0.00095453	1.25E-08
1631	466750	3782660	1.17E-07	0.0025216	0	0.00091031	1.19E-08
1632	466800	3782660	1.17E-07	0.0025293	0	0.00091308	1.20E-08
1633	466850	3782660	1.31E-07	0.0028259	0	0.0010202	1.34E-08
1634	466900	3782660	1.32E-07	0.0028418	0	0.0010259	1.34E-08
1635	466950	3782660	1.22E-07	0.002635	0	0.00095125	1.25E-08
1636	467000	3782660	1.17E-07	0.0025317	0	0.00091397	1.20E-08
1637	467050	3782660	1.14E-07	0.0024562	0	0.00088671	1.16E-08
1638	467100	3782660	1.11E-07	0.0023922	0	0.00086361	1.13E-08
1639	467150	3782660	1.06E-07	0.0022892	0	0.00082642	1.08E-08
1640	467200	3782660	1.05E-07	0.0022648	0	0.0008176	1.07E-08
1641	467250	3782660	9.17E-08	0.0019775	0	0.00071389	9.35E-09
1642	467300	3782660	7.21E-08	0.0015537	0	0.0005609	7.35E-09
1643	467350	3782660	6.65E-08	0.0014345	0	0.00051787	6.78E-09
1644	467400	3782660	5.81E-08	0.001253	0	0.00045233	5.92E-09
1645	467450	3782660	6.10E-08	0.0013158	0	0.00047503	6.22E-09
1646	467500	3782660	5.86E-08	0.0012631	0	0.000456	5.97E-09
1647	467550	3782660	4.37E-08	0.0009426	0	0.00034029	4.46E-09
1648	467600	3782660	3.93E-08	0.0008462	0	0.00030548	4.00E-09
1649	467650	3782660	4.81E-08	0.0010379	0	0.00037469	4.91E-09
1650	467700	3782660	4.46E-08	0.0009621	0	0.00034733	4.55E-09
1651	464900	3779360	1.33E-08	0.00028591	0	0.00010322	1.35E-09
1652	465000	3779360	9.75E-09	0.00021011	8.18E-06	7.59E-05	9.93E-10
1653	465100	3779360	5.57E-09	0.00012002	1.80E-05	4.33E-05	5.67E-10
1654	465200	3779360	8.28E-10	1.79E-05	0	6.44E-06	8.44E-11
1655	465300	3779360	-3.92E-09	0	0	0	-4.48E-10
1656	465400	3779360	-9.24E-09	0	0	0	-1.05E-09
1657	465500	3779360	-1.53E-08	0	9.00E-05	0	-1.75E-09
1658	465600	3779360	-2.23E-08	0	0.00014717	0	-2.55E-09
1659	465700	3779360	-3.01E-08	0	1.45E-06	0	-3.44E-09
1660	465800	3779360	-3.87E-08	0	0	0	-4.42E-09
1661	465900	3779360	-4.82E-08	0	0	0	-5.50E-09
1662	466000	3779360	-5.79E-08	0	0	0	-6.62E-09
1663	466100	3779360	-6.73E-08	0	0	0	-7.68E-09
1664	466200	3779360	-7.76E-08	0	0	0	-8.86E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1665	466300	3779360	-8.75E-08	0	0	0	-1.00E-08
1666	466400	3779360	-9.67E-08	0	0	0	-1.10E-08
1667	466500	3779360	-1.05E-07	0	0	0	-1.20E-08
1668	466600	3779360	-1.12E-07	0	0	0	-1.28E-08
1669	466700	3779360	-1.20E-07	0	0	0	-1.38E-08
1670	466800	3779360	-1.25E-07	0	0	0	-1.43E-08
1671	466900	3779360	-1.28E-07	0	0	0	-1.47E-08
1672	467000	3779360	-1.30E-07	0	0	0	-1.48E-08
1673	467100	3779360	-1.30E-07	0	8.73E-05	0	-1.48E-08
1674	467200	3779360	-1.28E-07	0	0.00022101	0	-1.47E-08
1675	467300	3779360	-1.26E-07	0	0	0	-1.44E-08
1676	467400	3779360	-1.23E-07	0	0	0	-1.40E-08
1677	467500	3779360	-1.19E-07	0	0	0	-1.35E-08
1678	467600	3779360	-1.14E-07	0	0	0	-1.30E-08
1679	467700	3779360	-1.09E-07	0	0	0	-1.25E-08
1680	467800	3779360	-1.04E-07	0	0	0	-1.19E-08
1681	467900	3779360	-9.88E-08	0	5.41E-05	0	-1.13E-08
1682	468000	3779360	-9.36E-08	0	1.03E-05	0	-1.07E-08
1683	468100	3779360	-8.86E-08	0	0	0	-1.01E-08
1684	468200	3779360	-8.34E-08	0	0	0	-9.53E-09
1685	468300	3779360	-7.86E-08	0	0	0	-8.97E-09
1686	468400	3779360	-7.40E-08	0	0	0	-8.45E-09
1687	468500	3779360	-6.96E-08	0	0	0	-7.94E-09
1688	464900	3779460	1.85E-08	0.00039797	2.45E-05	0.00014367	1.88E-09
1689	465000	3779460	1.47E-08	0.00031777	1.18E-05	0.00011472	1.50E-09
1690	465100	3779460	1.04E-08	0.00022411	9.86E-06	8.09E-05	1.06E-09
1691	465200	3779460	5.20E-09	0.00011206	1.96E-05	4.05E-05	5.30E-10
1692	465300	3779460	-8.19E-10	0	0	0	-9.35E-11
1693	465400	3779460	-6.87E-09	0	0	0	-7.84E-10
1694	465500	3779460	-1.38E-08	0	0	0	-1.58E-09
1695	465600	3779460	-2.19E-08	0	0.0001659	0	-2.50E-09
1696	465700	3779460	-3.09E-08	0	9.19E-05	0	-3.53E-09
1697	465800	3779460	-4.10E-08	0	0	0	-4.69E-09
1698	465900	3779460	-5.23E-08	0	0	0	-5.97E-09
1699	466000	3779460	-6.39E-08	0	0	0	-7.30E-09
1700	466100	3779460	-7.54E-08	0	0	0	-8.61E-09
1701	466200	3779460	-8.81E-08	0	0	0	-1.01E-08
1702	466300	3779460	-1.00E-07	0	0	0	-1.15E-08
1703	466400	3779460	-1.13E-07	0	0	0	-1.29E-08
1704	466500	3779460	-1.22E-07	0	0	0	-1.39E-08
1705	466600	3779460	-1.32E-07	0	0	0	-1.50E-08
1706	466700	3779460	-1.41E-07	0	0	0	-1.61E-08
1707	466800	3779460	-1.46E-07	0	0	0	-1.67E-08
1708	466900	3779460	-1.50E-07	0	0	0	-1.71E-08
1709	467000	3779460	-1.51E-07	0	0	0	-1.73E-08
1710	467100	3779460	-1.50E-07	0	0.00012597	0	-1.72E-08
1711	467200	3779460	-1.48E-07	0	0.00014415	0	-1.69E-08
1712	467300	3779460	-1.45E-07	0	0	0	-1.65E-08
1713	467400	3779460	-1.40E-07	0	0	0	-1.60E-08
1714	467500	3779460	-1.35E-07	0	0	0	-1.54E-08
1715	467600	3779460	-1.29E-07	0	0	0	-1.47E-08
1716	467700	3779460	-1.23E-07	0	0	0	-1.40E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1717	467800	3779460	-1.16E-07	0	3.82E-05	0	-1.33E-08
1718	467900	3779460	-1.10E-07	0	7.85E-06	0	-1.26E-08
1719	468000	3779460	-1.04E-07	0	0	0	-1.18E-08
1720	468100	3779460	-9.74E-08	0	0	0	-1.11E-08
1721	468200	3779460	-9.13E-08	0	0	0	-1.04E-08
1722	468300	3779460	-8.56E-08	0	0	0	-9.77E-09
1723	468400	3779460	-8.02E-08	0	0	0	-9.16E-09
1724	468500	3779460	-7.51E-08	0	0	0	-8.58E-09
1725	464900	3779560	2.49E-08	0.00053776	3.23E-05	0.00019414	2.54E-09
1726	465000	3779560	2.13E-08	0.00045867	1.32E-05	0.00016558	2.17E-09
1727	465100	3779560	1.66E-08	0.00035814	2.07E-05	0.00012929	1.69E-09
1728	465200	3779560	1.10E-08	0.00023675	2.50E-05	8.55E-05	1.12E-09
1729	465300	3779560	4.06E-09	8.76E-05	0	3.16E-05	4.14E-10
1730	465400	3779560	-3.44E-09	0	0	0	-3.93E-10
1731	465500	3779560	-1.15E-08	0	0	0	-1.32E-09
1732	465600	3779560	-2.07E-08	0	0.00010225	0	-2.36E-09
1733	465700	3779560	-3.11E-08	0	0.00013419	0	-3.56E-09
1734	465800	3779560	-4.30E-08	0	0	0	-4.91E-09
1735	465900	3779560	-5.63E-08	0	0	0	-6.43E-09
1736	466000	3779560	-7.03E-08	0	0	0	-8.03E-09
1737	466100	3779560	-8.49E-08	0	0	0	-9.69E-09
1738	466200	3779560	-1.01E-07	0	0	0	-1.16E-08
1739	466300	3779560	-1.18E-07	0	0	0	-1.34E-08
1740	466400	3779560	-1.32E-07	0	0	0	-1.51E-08
1741	466500	3779560	-1.43E-07	0	0	0	-1.64E-08
1742	466600	3779560	-1.57E-07	0	0	0	-1.80E-08
1743	466700	3779560	-1.66E-07	0	0	0	-1.90E-08
1744	466800	3779560	-1.73E-07	0	0	0	-1.97E-08
1745	466900	3779560	-1.76E-07	0	0	0	-2.02E-08
1746	467000	3779560	-1.77E-07	0	3.24E-06	0	-2.02E-08
1747	467100	3779560	-1.76E-07	0	0.00015303	0	-2.01E-08
1748	467200	3779560	-1.72E-07	0	0	0	-1.97E-08
1749	467300	3779560	-1.67E-07	0	0	0	-1.91E-08
1750	467400	3779560	-1.61E-07	0	0	0	-1.84E-08
1751	467500	3779560	-1.54E-07	0	0	0	-1.76E-08
1752	467600	3779560	-1.46E-07	0	0	0	-1.67E-08
1753	467700	3779560	-1.38E-07	0	0	0	-1.58E-08
1754	467800	3779560	-1.30E-07	0	9.86E-06	0	-1.49E-08
1755	467900	3779560	-1.22E-07	0	0	0	-1.40E-08
1756	468000	3779560	-1.15E-07	0	0	0	-1.31E-08
1757	468100	3779560	-1.07E-07	0	0	0	-1.22E-08
1758	468200	3779560	-9.99E-08	0	0	0	-1.14E-08
1759	468300	3779560	-9.32E-08	0	0	0	-1.06E-08
1760	468400	3779560	-8.70E-08	0	0	0	-9.93E-09
1761	468500	3779560	-8.12E-08	0	0	0	-9.27E-09
1762	464900	3779660	3.31E-08	0.00071409	4.04E-05	0.00025779	3.38E-09
1763	465000	3779660	2.94E-08	0.00063389	2.86E-05	0.00022884	3.00E-09
1764	465100	3779660	2.46E-08	0.00052953	2.50E-05	0.00019116	2.50E-09
1765	465200	3779660	1.84E-08	0.00039605	2.14E-05	0.00014298	1.87E-09
1766	465300	3779660	1.10E-08	0.0002373	3.15E-05	8.57E-05	1.12E-09
1767	465400	3779660	1.66E-09	3.57E-05	0	1.29E-05	1.69E-10
1768	465500	3779660	-7.66E-09	0	0	0	-8.75E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1769	465600	3779660	-1.82E-08	0	0	0	-2.08E-09
1770	465700	3779660	-3.02E-08	0	0.00014533	0	-3.45E-09
1771	465800	3779660	-4.48E-08	0	0	0	-5.11E-09
1772	465900	3779660	-6.06E-08	0	0	0	-6.93E-09
1773	466000	3779660	-7.85E-08	0	0	0	-8.97E-09
1774	466100	3779660	-9.70E-08	0	0	0	-1.11E-08
1775	466200	3779660	-1.16E-07	0	0	0	-1.33E-08
1776	466300	3779660	-1.37E-07	0	0	0	-1.57E-08
1777	466400	3779660	-1.56E-07	0	0	0	-1.78E-08
1778	466500	3779660	-1.70E-07	0	0	0	-1.94E-08
1779	466600	3779660	-1.87E-07	0	0	0	-2.13E-08
1780	466700	3779660	-1.98E-07	0	0	0	-2.26E-08
1781	466800	3779660	-2.06E-07	0	0	0	-2.35E-08
1782	466900	3779660	-2.10E-07	0	0	0	-2.40E-08
1783	467000	3779660	-2.10E-07	0	2.74E-05	0	-2.40E-08
1784	467100	3779660	-2.07E-07	0	0.00016612	0	-2.36E-08
1785	467200	3779660	-2.02E-07	0	0	0	-2.31E-08
1786	467300	3779660	-1.95E-07	0	0	0	-2.22E-08
1787	467400	3779660	-1.86E-07	0	0	0	-2.12E-08
1788	467500	3779660	-1.77E-07	0	0	0	-2.02E-08
1789	467600	3779660	-1.66E-07	0	0	0	-1.90E-08
1790	467700	3779660	-1.56E-07	0	1.49E-05	0	-1.78E-08
1791	467800	3779660	-1.46E-07	0	0	0	-1.67E-08
1792	467900	3779660	-1.36E-07	0	0	0	-1.56E-08
1793	468000	3779660	-1.27E-07	0	0	0	-1.45E-08
1794	468100	3779660	-1.18E-07	0	0	0	-1.35E-08
1795	468200	3779660	-1.09E-07	0	0	0	-1.25E-08
1796	468300	3779660	-1.02E-07	0	0	0	-1.16E-08
1797	468400	3779660	-9.44E-08	0	0	0	-1.08E-08
1798	468500	3779660	-8.78E-08	0	0	0	-1.00E-08
1799	464900	3779760	4.29E-08	0.00092447	0.00017008	0.00033374	4.37E-09
1800	465000	3779760	3.93E-08	0.00084812	4.37E-05	0.00030618	4.01E-09
1801	465100	3779760	3.46E-08	0.00074622	1.79E-05	0.00026939	3.53E-09
1802	465200	3779760	2.81E-08	0.00060478	3.37E-05	0.00021833	2.86E-09
1803	465300	3779760	2.00E-08	0.0004312	6.16E-05	0.00015567	2.04E-09
1804	465400	3779760	1.01E-08	0.00021752	2.10E-05	7.85E-05	1.03E-09
1805	465500	3779760	-1.74E-09	0	0	0	-1.98E-10
1806	465600	3779760	-1.34E-08	0	0	0	-1.53E-09
1807	465700	3779760	-2.80E-08	0	0	0	-3.20E-09
1808	465800	3779760	-4.56E-08	0	3.07E-05	0	-5.20E-09
1809	465900	3779760	-6.50E-08	0	0	0	-7.42E-09
1810	466000	3779760	-8.68E-08	0	0	0	-9.92E-09
1811	466100	3779760	-1.10E-07	0	0	0	-1.26E-08
1812	466200	3779760	-1.35E-07	0	0	0	-1.54E-08
1813	466300	3779760	-1.61E-07	0	0	0	-1.84E-08
1814	466400	3779760	-1.85E-07	0	0	0	-2.11E-08
1815	466500	3779760	-2.05E-07	0	0	0	-2.34E-08
1816	466600	3779760	-2.25E-07	0	0	0	-2.57E-08
1817	466700	3779760	-2.39E-07	0	0	0	-2.73E-08
1818	466800	3779760	-2.48E-07	0	0	0	-2.84E-08
1819	466900	3779760	-2.52E-07	0	0	0	-2.88E-08
1820	467000	3779760	-2.51E-07	0	3.36E-05	0	-2.87E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1821	467100	3779760	-2.46E-07	0	0	0	-2.81E-08
1822	467200	3779760	-2.38E-07	0	0	0	-2.72E-08
1823	467300	3779760	-2.28E-07	0	0	0	-2.61E-08
1824	467400	3779760	-2.16E-07	0	0	0	-2.47E-08
1825	467500	3779760	-2.03E-07	0	0	0	-2.32E-08
1826	467600	3779760	-1.90E-07	0	9.67E-06	0	-2.17E-08
1827	467700	3779760	-1.77E-07	0	0	0	-2.02E-08
1828	467800	3779760	-1.65E-07	0	0	0	-1.88E-08
1829	467900	3779760	-1.52E-07	0	0	0	-1.74E-08
1830	468000	3779760	-1.41E-07	0	0	0	-1.61E-08
1831	468100	3779760	-1.30E-07	0	0	0	-1.48E-08
1832	468200	3779760	-1.20E-07	0	0	0	-1.37E-08
1833	468300	3779760	-1.11E-07	0	0	0	-1.27E-08
1834	468400	3779760	-1.03E-07	0	0	0	-1.17E-08
1835	468500	3779760	-9.50E-08	0	0	0	-1.08E-08
1836	464900	3779860	5.43E-08	0.00117	0.00025503	0.00042238	5.53E-09
1837	465000	3779860	5.15E-08	0.0011101	0.00017751	0.00040077	5.25E-09
1838	465100	3779860	4.71E-08	0.0010159	5.45E-05	0.00036676	4.80E-09
1839	465200	3779860	4.09E-08	0.00088135	0	0.00031818	4.17E-09
1840	465300	3779860	3.26E-08	0.0007031	3.68E-05	0.00025383	3.32E-09
1841	465400	3779860	2.20E-08	0.00047322	0.00010637	0.00017084	2.24E-09
1842	465500	3779860	9.47E-09	0.00020406	0	7.37E-05	9.65E-10
1843	465600	3779860	-6.13E-09	0	0	0	-7.01E-10
1844	465700	3779860	-2.44E-08	0	0	0	-2.78E-09
1845	465800	3779860	-4.48E-08	0	0	0	-5.11E-09
1846	465900	3779860	-6.86E-08	0	0	0	-7.83E-09
1847	466000	3779860	-9.56E-08	0	0	0	-1.09E-08
1848	466100	3779860	-1.25E-07	0	0	0	-1.43E-08
1849	466200	3779860	-1.57E-07	0	0	0	-1.80E-08
1850	466300	3779860	-1.91E-07	0	0	0	-2.19E-08
1851	466400	3779860	-2.21E-07	0	0	0	-2.52E-08
1852	466500	3779860	-2.52E-07	0	0	0	-2.88E-08
1853	466600	3779860	-2.75E-07	0	0	0	-3.14E-08
1854	466700	3779860	-2.93E-07	0	0	0	-3.35E-08
1855	466800	3779860	-3.04E-07	0	0	0	-3.47E-08
1856	466900	3779860	-3.07E-07	0	0	0	-3.51E-08
1857	467000	3779860	-3.04E-07	0	1.71E-05	0	-3.47E-08
1858	467100	3779860	-2.96E-07	0	0	0	-3.38E-08
1859	467200	3779860	-2.84E-07	0	0	0	-3.24E-08
1860	467300	3779860	-2.69E-07	0	0	0	-3.07E-08
1861	467400	3779860	-2.53E-07	0	0	0	-2.89E-08
1862	467500	3779860	-2.35E-07	0	0	0	-2.69E-08
1863	467600	3779860	-2.18E-07	0	0	0	-2.49E-08
1864	467700	3779860	-2.01E-07	0	0	0	-2.30E-08
1865	467800	3779860	-1.85E-07	0	0	0	-2.12E-08
1866	467900	3779860	-1.70E-07	0	0	0	-1.95E-08
1867	468000	3779860	-1.56E-07	0	0	0	-1.78E-08
1868	468100	3779860	-1.43E-07	0	0	0	-1.63E-08
1869	468200	3779860	-1.31E-07	0	0	0	-1.50E-08
1870	468300	3779860	-1.21E-07	0	0	0	-1.38E-08
1871	468400	3779860	-1.12E-07	0	0	0	-1.27E-08
1872	468500	3779860	-1.03E-07	0	0	0	-1.18E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1873	464900	3779960	6.77E-08	0.0014587	0.00024133	0.00052659	6.90E-09
1874	465000	3779960	6.61E-08	0.0014249	0.00031759	0.0005144	6.74E-09
1875	465100	3779960	6.27E-08	0.0013521	0.00018243	0.00048812	6.39E-09
1876	465200	3779960	5.76E-08	0.0012411	5.85E-05	0.00044806	5.87E-09
1877	465300	3779960	4.95E-08	0.0010681	2.40E-05	0.0003856	5.05E-09
1878	465400	3779960	3.86E-08	0.00083191	0.00012221	0.00030033	3.93E-09
1879	465500	3779960	2.49E-08	0.00053749	9.83E-05	0.00019404	2.54E-09
1880	465600	3779960	4.89E-09	0.00010547	0	3.81E-05	4.99E-10
1881	465700	3779960	-1.63E-08	0	7.25E-05	0	-1.86E-09
1882	465800	3779960	-4.10E-08	0	0	0	-4.69E-09
1883	465900	3779960	-7.05E-08	0	0	0	-8.05E-09
1884	466000	3779960	-1.05E-07	0	0	0	-1.20E-08
1885	466100	3779960	-1.44E-07	0	0	0	-1.64E-08
1886	466200	3779960	-1.86E-07	0	0	0	-2.13E-08
1887	466300	3779960	-2.30E-07	0	0	0	-2.62E-08
1888	466400	3779960	-2.69E-07	0	0	0	-3.07E-08
1889	466500	3779960	-3.11E-07	0	0	0	-3.55E-08
1890	466600	3779960	-3.42E-07	0	0	0	-3.90E-08
1891	466700	3779960	-3.64E-07	0	0	0	-4.16E-08
1892	466800	3779960	-3.77E-07	0	0	0	-4.31E-08
1893	466900	3779960	-3.79E-07	0	0	0	-4.33E-08
1894	467000	3779960	-3.73E-07	0	0	0	-4.26E-08
1895	467100	3779960	-3.60E-07	0	0	0	-4.11E-08
1896	467200	3779960	-3.41E-07	0	0	0	-3.90E-08
1897	467300	3779960	-3.20E-07	0	0	0	-3.65E-08
1898	467400	3779960	-2.97E-07	0	0	0	-3.39E-08
1899	467500	3779960	-2.74E-07	0	0	0	-3.13E-08
1900	467600	3779960	-2.51E-07	0	0	0	-2.86E-08
1901	467700	3779960	-2.29E-07	0	0	0	-2.62E-08
1902	467800	3779960	-2.09E-07	0	0	0	-2.39E-08
1903	467900	3779960	-1.91E-07	0	0	0	-2.18E-08
1904	468000	3779960	-1.73E-07	0	0	0	-1.98E-08
1905	468100	3779960	-1.58E-07	0	0	0	-1.81E-08
1906	468200	3779960	-1.45E-07	0	0	0	-1.65E-08
1907	468300	3779960	-1.33E-07	0	0	0	-1.51E-08
1908	468400	3779960	-1.22E-07	0	0	0	-1.39E-08
1909	468500	3779960	-1.12E-07	0	0	0	-1.28E-08
1910	464900	3780060	8.34E-08	0.0017984	0.00012632	0.00064924	8.50E-09
1911	465000	3780060	8.37E-08	0.0018053	0.00032873	0.00065172	8.53E-09
1912	465100	3780060	8.26E-08	0.0017797	0.00037053	0.0006425	8.41E-09
1913	465200	3780060	7.90E-08	0.0017039	0.00017986	0.00061513	8.06E-09
1914	465300	3780060	7.20E-08	0.0015526	4.37E-05	0.0005605	7.34E-09
1915	465400	3780060	6.17E-08	0.0013307	7.90E-05	0.00048039	6.29E-09
1916	465500	3780060	4.71E-08	0.0010154	0.00017429	0.00036656	4.80E-09
1917	465600	3780060	2.65E-08	0.00057072	8.92E-06	0.00020604	2.70E-09
1918	465700	3780060	-2.41E-09	0	0.00032667	0	-2.76E-10
1919	465800	3780060	-3.24E-08	0	5.23E-05	0	-3.70E-09
1920	465900	3780060	-6.87E-08	0	0	0	-7.85E-09
1921	466000	3780060	-1.13E-07	0	0	0	-1.29E-08
1922	466100	3780060	-1.64E-07	0	0	0	-1.87E-08
1923	466200	3780060	-2.20E-07	0	0	0	-2.51E-08
1924	466300	3780060	-2.79E-07	0	0	0	-3.19E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1925	466400	3780060	-3.33E-07	0	0	0	-3.80E-08
1926	466500	3780060	-3.90E-07	0	0	0	-4.46E-08
1927	466600	3780060	-4.33E-07	0	0	0	-4.94E-08
1928	466700	3780060	-4.62E-07	0	0	0	-5.28E-08
1929	466800	3780060	-4.76E-07	0	0	0	-5.44E-08
1930	466900	3780060	-4.77E-07	0	0	0	-5.44E-08
1931	467000	3780060	-4.64E-07	0	0	0	-5.30E-08
1932	467100	3780060	-4.42E-07	0	0	0	-5.05E-08
1933	467200	3780060	-4.14E-07	0	0	0	-4.73E-08
1934	467300	3780060	-3.83E-07	0	0	0	-4.38E-08
1935	467400	3780060	-3.51E-07	0	0	0	-4.01E-08
1936	467500	3780060	-3.20E-07	0	0	0	-3.65E-08
1937	467600	3780060	-2.90E-07	0	0	0	-3.31E-08
1938	467700	3780060	-2.62E-07	0	0	0	-2.99E-08
1939	467800	3780060	-2.36E-07	0	0	0	-2.70E-08
1940	467900	3780060	-2.14E-07	0	0	0	-2.44E-08
1941	468000	3780060	-1.95E-07	0	0	0	-2.23E-08
1942	468100	3780060	-1.76E-07	0	0	0	-2.01E-08
1943	468200	3780060	-1.59E-07	0	0	0	-1.82E-08
1944	468300	3780060	-1.45E-07	0	0	0	-1.66E-08
1945	468400	3780060	-1.33E-07	0	0	0	-1.52E-08
1946	468500	3780060	-1.22E-07	0	0	0	-1.39E-08
1947	464900	3780160	1.01E-07	0.0021832	2.56E-05	0.00078815	1.03E-08
1948	465000	3780160	1.05E-07	0.0022549	0.00019226	0.00081403	1.07E-08
1949	465100	3780160	1.06E-07	0.0022952	0.00044012	0.0008286	1.09E-08
1950	465200	3780160	1.05E-07	0.0022653	0.00044	0.0008178	1.07E-08
1951	465300	3780160	1.00E-07	0.0021593	0.00015907	0.00077953	1.02E-08
1952	465400	3780160	9.17E-08	0.0019772	3.94E-05	0.00071379	9.35E-09
1953	465500	3780160	7.82E-08	0.0016861	0.0002292	0.00060869	7.97E-09
1954	465600	3780160	5.68E-08	0.0012241	0.00015933	0.00044192	5.79E-09
1955	467800	3780160	-2.68E-07	0	0	0	-3.06E-08
1956	467900	3780160	-2.40E-07	0	0	0	-2.74E-08
1957	468000	3780160	-2.17E-07	0	0	0	-2.48E-08
1958	468100	3780160	-1.96E-07	0	0	0	-2.24E-08
1959	468200	3780160	-1.76E-07	0	0	0	-2.01E-08
1960	468300	3780160	-1.59E-07	0	0	0	-1.82E-08
1961	468400	3780160	-1.45E-07	0	0	0	-1.65E-08
1962	468500	3780160	-1.32E-07	0	0	0	-1.51E-08
1963	464900	3780260	1.21E-07	0.002618	0	0.00094511	1.24E-08
1964	465000	3780260	1.28E-07	0.0027693	0	0.00099974	1.31E-08
1965	465100	3780260	1.34E-07	0.0028852	0.00016277	0.0010416	1.36E-08
1966	465200	3780260	1.37E-07	0.0029525	0.0005375	0.0010659	1.40E-08
1967	465300	3780260	1.37E-07	0.0029489	0.00052358	0.0010646	1.39E-08
1968	465400	3780260	1.32E-07	0.002841	0.00011377	0.0010256	1.34E-08
1969	465500	3780260	1.21E-07	0.0025998	0.00016646	0.00093856	1.23E-08
1970	465600	3780260	1.00E-07	0.0021604	0.00033442	0.00077992	1.02E-08
1971	467800	3780260	-3.04E-07	0	0	0	-3.47E-08
1972	467900	3780260	-2.71E-07	0	0	0	-3.09E-08
1973	468000	3780260	-2.42E-07	0	0	0	-2.76E-08
1974	468100	3780260	-2.17E-07	0	0	0	-2.47E-08
1975	468200	3780260	-1.94E-07	0	0	0	-2.22E-08
1976	468300	3780260	-1.75E-07	0	0	0	-2.00E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
1977	468400	3780260	-1.58E-07	0	0	0	-1.81E-08
1978	468500	3780260	-1.43E-07	0	0	0	-1.64E-08
1979	464900	3780360	1.44E-07	0.0031145	0.00015512	0.0011244	1.47E-08
1980	465000	3780360	1.56E-07	0.0033581	6.26E-05	0.0012123	1.59E-08
1981	465100	3780360	1.66E-07	0.003585	1.23E-06	0.0012942	1.69E-08
1982	465200	3780360	1.75E-07	0.0037803	0.00020516	0.0013647	1.79E-08
1983	465300	3780360	1.82E-07	0.0039313	0.00054028	0.0014192	1.86E-08
1984	465400	3780360	1.84E-07	0.0039646	0.00052439	0.0014312	1.87E-08
1985	465500	3780360	1.78E-07	0.003844	0.00014463	0.0013877	1.82E-08
1986	465600	3780360	1.62E-07	0.00349	0.00041257	0.0012599	1.65E-08
1987	467800	3780360	-3.47E-07	0	0	0	-3.96E-08
1988	467900	3780360	-3.06E-07	0	0	0	-3.49E-08
1989	468000	3780360	-2.71E-07	0	0	0	-3.09E-08
1990	468100	3780360	-2.40E-07	0	0	0	-2.75E-08
1991	468200	3780360	-2.14E-07	0	0	0	-2.45E-08
1992	468300	3780360	-1.92E-07	0	0	0	-2.19E-08
1993	468400	3780360	-1.72E-07	0	0	0	-1.97E-08
1994	468500	3780360	-1.55E-07	0	0	0	-1.77E-08
1995	464900	3780460	1.69E-07	0.0036441	0.00016079	0.0013155	1.72E-08
1996	465000	3780460	1.86E-07	0.0040027	0.00018665	0.001445	1.89E-08
1997	465100	3780460	2.03E-07	0.0043785	0.00017332	0.0015807	2.07E-08
1998	465200	3780460	2.21E-07	0.0047709	0.0001606	0.0017224	2.26E-08
1999	465300	3780460	2.38E-07	0.005125	0.00041036	0.0018502	2.42E-08
2000	465400	3780460	2.50E-07	0.005384	0.00065234	0.0019437	2.55E-08
2001	465500	3780460	2.55E-07	0.0054924	0.00035336	0.0019828	2.60E-08
2002	465600	3780460	2.48E-07	0.0053395	0.00019631	0.0019276	2.52E-08
2003	467800	3780460	-3.97E-07	0	0	0	-4.54E-08
2004	467900	3780460	-3.46E-07	0	0	0	-3.95E-08
2005	468000	3780460	-3.03E-07	0	0	0	-3.46E-08
2006	468100	3780460	-2.67E-07	0	0	0	-3.05E-08
2007	468200	3780460	-2.36E-07	0	0	0	-2.69E-08
2008	468300	3780460	-2.10E-07	0	0	0	-2.39E-08
2009	468400	3780460	-1.87E-07	0	0	0	-2.13E-08
2010	468500	3780460	-1.67E-07	0	0	0	-1.91E-08
2011	464900	3780560	1.95E-07	0.0042126	0.00021569	0.0015208	1.99E-08
2012	465000	3780560	2.19E-07	0.0047188	0.00024103	0.0017035	2.23E-08
2013	465100	3780560	2.45E-07	0.0052865	0.00025092	0.0019085	2.50E-08
2014	465200	3780560	2.74E-07	0.0059036	0.00023658	0.0021313	2.79E-08
2015	465300	3780560	3.04E-07	0.0065504	0.00027163	0.0023648	3.10E-08
2016	465400	3780560	3.32E-07	0.0071623	0.00086709	0.0025857	3.39E-08
2017	465500	3780560	3.56E-07	0.0076734	0.0010048	0.0027702	3.63E-08
2018	465600	3780560	3.67E-07	0.0079063	0.00021486	0.0028543	3.74E-08
2019	467800	3780560	-4.54E-07	0	0	0	-5.19E-08
2020	467900	3780560	-3.91E-07	0	0	0	-4.46E-08
2021	468000	3780560	-3.39E-07	0	0	0	-3.87E-08
2022	468100	3780560	-2.95E-07	0	0	0	-3.37E-08
2023	468200	3780560	-2.58E-07	0	0	0	-2.95E-08
2024	468300	3780560	-2.28E-07	0	0	0	-2.60E-08
2025	468400	3780560	-2.01E-07	0	0	0	-2.30E-08
2026	468500	3780560	-1.79E-07	0	0	0	-2.04E-08
2027	464900	3780660	2.24E-07	0.0048204	0.00028619	0.0017402	2.28E-08
2028	465000	3780660	2.54E-07	0.0054842	0.00034233	0.0019798	2.59E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2029	465100	3780660	2.91E-07	0.0062675	0.00036198	0.0022626	2.96E-08
2030	465200	3780660	3.33E-07	0.0071722	0.00035005	0.0025892	3.39E-08
2031	465300	3780660	3.80E-07	0.0081991	0.00038131	0.00296	3.88E-08
2032	465400	3780660	4.31E-07	0.0092985	0.00040238	0.0033569	4.40E-08
2033	465500	3780660	4.84E-07	0.010429	0.0012582	0.0037649	4.93E-08
2034	465600	3780660	5.24E-07	0.011307	0.0015835	0.0040818	5.35E-08
2035	467800	3780660	-5.16E-07	0	0	0	-5.89E-08
2036	467900	3780660	-4.38E-07	0	0	0	-5.00E-08
2037	468000	3780660	-3.75E-07	0	0	0	-4.28E-08
2038	468100	3780660	-3.23E-07	0	0	0	-3.69E-08
2039	468200	3780660	-2.80E-07	0	0	0	-3.20E-08
2040	468300	3780660	-2.45E-07	0	0	0	-2.79E-08
2041	468400	3780660	-2.15E-07	0	0	0	-2.45E-08
2042	468500	3780660	-1.89E-07	0	0	0	-2.16E-08
2043	464900	3780760	2.52E-07	0.0054361	0.00058039	0.0019625	2.57E-08
2044	465000	3780760	2.92E-07	0.0062854	0.00049877	0.0022691	2.97E-08
2045	465100	3780760	3.39E-07	0.0073175	0.00041737	0.0026417	3.46E-08
2046	465200	3780760	3.97E-07	0.0085584	0.00047481	0.0030896	4.05E-08
2047	465300	3780760	4.66E-07	0.010046	0.00054401	0.0036266	4.75E-08
2048	465400	3780760	5.47E-07	0.011783	0.00062089	0.0042537	5.57E-08
2049	465500	3780760	6.40E-07	0.013805	0.00065307	0.0049837	6.53E-08
2050	465600	3780760	7.40E-07	0.015943	0.0019477	0.0057554	7.54E-08
2051	467800	3780760	-5.76E-07	0	0	0	-6.58E-08
2052	467900	3780760	-4.82E-07	0	0	0	-5.51E-08
2053	468000	3780760	-4.07E-07	0	0	0	-4.65E-08
2054	468100	3780760	-3.47E-07	0	0	0	-3.96E-08
2055	468200	3780760	-2.98E-07	0	0	0	-3.41E-08
2056	468300	3780760	-2.58E-07	0	0	0	-2.95E-08
2057	468400	3780760	-2.25E-07	0	0	0	-2.57E-08
2058	468500	3780760	-1.97E-07	0	0	0	-2.25E-08
2059	464900	3780860	2.80E-07	0.0060434	0.00042956	0.0021817	2.86E-08
2060	465000	3780860	3.29E-07	0.0070871	0.00067226	0.0025585	3.35E-08
2061	465100	3780860	3.89E-07	0.0083851	0.00082268	0.0030271	3.96E-08
2062	465200	3780860	4.64E-07	0.010006	0.00076743	0.0036123	4.73E-08
2063	465300	3780860	5.58E-07	0.012039	0.0005739	0.0043463	5.69E-08
2064	465400	3780860	6.77E-07	0.014593	0.00069441	0.0052683	6.90E-08
2065	465500	3780860	8.23E-07	0.017737	0.00081622	0.0064034	8.39E-08
2066	465600	3780860	1.01E-06	0.021673	0.0010593	0.0078241	1.02E-07
2067	467800	3780860	-6.22E-07	0	0	0	-7.10E-08
2068	467900	3780860	-5.13E-07	0	0	0	-5.85E-08
2069	468000	3780860	-4.28E-07	0	0	0	-4.88E-08
2070	468100	3780860	-3.61E-07	0	0	0	-4.12E-08
2071	468200	3780860	-3.07E-07	0	0	0	-3.51E-08
2072	468300	3780860	-2.64E-07	0	0	0	-3.02E-08
2073	468400	3780860	-2.29E-07	0	0	0	-2.61E-08
2074	468500	3780860	-1.99E-07	0	0	0	-2.27E-08
2075	464900	3780960	3.21E-07	0.0069179	0	0.0024974	3.27E-08
2076	465000	3780960	3.76E-07	0.0081088	0.00010995	0.0029273	3.83E-08
2077	465100	3780960	4.49E-07	0.009674	0.00038744	0.0034924	4.57E-08
2078	465200	3780960	5.47E-07	0.011786	0.0007754	0.004255	5.57E-08
2079	465300	3780960	6.65E-07	0.014327	0.0010363	0.0051721	6.77E-08
2080	465400	3780960	8.23E-07	0.017751	0.00090452	0.0064084	8.39E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2081	465500	3780960	1.03E-06	0.022137	0.00033441	0.0079918	1.05E-07
2082	465600	3780960	1.33E-06	0.028613	0.00040225	0.010329	1.35E-07
2083	467800	3780960	-6.29E-07	0	0	0	-7.19E-08
2084	467900	3780960	-5.14E-07	0	0	0	-5.87E-08
2085	468000	3780960	-4.25E-07	0	0	0	-4.86E-08
2086	468100	3780960	-3.56E-07	0	0	0	-4.07E-08
2087	468200	3780960	-3.02E-07	0	0	0	-3.45E-08
2088	468300	3780960	-2.58E-07	0	0	0	-2.94E-08
2089	468400	3780960	-2.22E-07	0	0	0	-2.54E-08
2090	468500	3780960	-1.93E-07	0	0	0	-2.21E-08
2091	464900	3781060	3.46E-07	0.0074488	0	0.0026891	3.52E-08
2092	465000	3781060	4.12E-07	0.008883	0	0.0032068	4.20E-08
2093	465100	3781060	4.98E-07	0.010742	1.24E-05	0.0038779	5.08E-08
2094	465200	3781060	6.11E-07	0.013177	7.81E-05	0.0047571	6.23E-08
2095	465300	3781060	7.64E-07	0.016472	0.00044488	0.0059466	7.79E-08
2096	465400	3781060	9.71E-07	0.020934	0.0013986	0.0075574	9.90E-08
2097	465500	3781060	1.25E-06	0.02704	0.0024153	0.0097617	1.28E-07
2098	465600	3781060	1.69E-06	0.036529	0.0022775	0.013187	1.73E-07
2099	467800	3781060	-5.82E-07	0	0	0	-6.65E-08
2100	467900	3781060	-4.75E-07	0	0	0	-5.43E-08
2101	468000	3781060	-3.93E-07	0	0	0	-4.49E-08
2102	468100	3781060	-3.29E-07	0	0	0	-3.76E-08
2103	468200	3781060	-2.79E-07	0	0	0	-3.18E-08
2104	468300	3781060	-2.38E-07	0	0	0	-2.72E-08
2105	468400	3781060	-2.05E-07	0	0	0	-2.35E-08
2106	468500	3781060	-1.79E-07	0	0	0	-2.04E-08
2107	464900	3781160	3.54E-07	0.0076257	0	0.0027529	3.61E-08
2108	465000	3781160	4.24E-07	0.0091494	0	0.003303	4.33E-08
2109	465100	3781160	5.20E-07	0.011205	0	0.0040451	5.30E-08
2110	465200	3781160	6.43E-07	0.013862	0	0.0050042	6.55E-08
2111	465300	3781160	8.19E-07	0.017659	0	0.006375	8.35E-08
2112	465400	3781160	1.07E-06	0.023135	0.00013088	0.0083521	1.09E-07
2113	465500	3781160	1.44E-06	0.031099	0.00053122	0.011227	1.47E-07
2114	465600	3781160	1.99E-06	0.042952	0.0021769	0.015506	2.03E-07
2115	467800	3781160	-4.91E-07	0	0	0	-5.61E-08
2116	467900	3781160	-4.04E-07	0	0	0	-4.62E-08
2117	468000	3781160	-3.37E-07	0	0	0	-3.85E-08
2118	468100	3781160	-2.84E-07	0	0	0	-3.24E-08
2119	468200	3781160	-2.42E-07	0	0	0	-2.76E-08
2120	468300	3781160	-2.08E-07	0	0	0	-2.37E-08
2121	468400	3781160	-1.80E-07	0	0	0	-2.06E-08
2122	468500	3781160	-1.57E-07	0	0	0	-1.79E-08
2123	464900	3781260	2.06E-07	0.0044342	0	0.0016008	2.10E-08
2124	465000	3781260	3.26E-07	0.0070365	0.00012546	0.0025402	3.33E-08
2125	465100	3781260	3.98E-07	0.0085803	0.00017591	0.0030976	4.06E-08
2126	465200	3781260	5.37E-07	0.011578	0.00028262	0.0041796	5.47E-08
2127	465300	3781260	8.00E-07	0.01724	0.00047025	0.0062238	8.15E-08
2128	465400	3781260	1.11E-06	0.023996	0.00075293	0.0086629	1.13E-07
2129	465500	3781260	1.52E-06	0.032735	0.00088235	0.011818	1.55E-07
2130	465600	3781260	2.16E-06	0.046578	0.00088491	0.016815	2.20E-07
2131	467800	3781260	-3.89E-07	0	0	0	-4.45E-08
2132	467900	3781260	-3.25E-07	0	0	0	-3.71E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2133	468000	3781260	-2.74E-07	0	0	0	-3.13E-08
2134	468100	3781260	-2.33E-07	0	0	0	-2.66E-08
2135	468200	3781260	-2.00E-07	0	0	0	-2.29E-08
2136	468300	3781260	-1.74E-07	0	0	0	-1.98E-08
2137	468400	3781260	-1.52E-07	0	0	0	-1.73E-08
2138	468500	3781260	-1.33E-07	0	0	0	-1.52E-08
2139	464900	3781360	-2.67E-08	0	0	0	-3.05E-09
2140	465000	3781360	1.08E-07	0.0023282	0	0.0008405	1.10E-08
2141	465100	3781360	1.17E-07	0.0025282	0	0.00091268	1.20E-08
2142	465200	3781360	3.15E-07	0.0067806	0	0.0024478	3.21E-08
2143	465300	3781360	4.50E-07	0.0097056	4.88E-05	0.0035038	4.59E-08
2144	465400	3781360	8.32E-07	0.017944	0.00055769	0.0064778	8.48E-08
2145	465500	3781360	1.21E-06	0.026009	0.0012321	0.0093896	1.23E-07
2146	465600	3781360	1.87E-06	0.04022	0.0022262	0.01452	1.90E-07
2147	467800	3781360	-3.05E-07	0	0	0	-3.49E-08
2148	467900	3781360	-2.57E-07	0	0	0	-2.94E-08
2149	468000	3781360	-2.20E-07	0	0	0	-2.51E-08
2150	468100	3781360	-1.89E-07	0	0	0	-2.16E-08
2151	468200	3781360	-1.64E-07	0	0	0	-1.87E-08
2152	468300	3781360	-1.43E-07	0	0	0	-1.63E-08
2153	468400	3781360	-1.26E-07	0	0	0	-1.44E-08
2154	468500	3781360	-1.11E-07	0	0	0	-1.27E-08
2155	464900	3781460	-1.69E-07	0	0	0	-1.93E-08
2156	465000	3781460	-9.67E-08	0	0	0	-1.10E-08
2157	465100	3781460	-6.41E-08	0	0	0	-7.33E-09
2158	465200	3781460	5.20E-08	0.0011211	0	0.00040473	5.30E-09
2159	465300	3781460	2.22E-07	0.0047753	0	0.0017239	2.26E-08
2160	465400	3781460	5.65E-07	0.012172	0.00013139	0.0043942	5.75E-08
2161	465500	3781460	8.98E-07	0.019356	0.00047997	0.0069876	9.15E-08
2162	465600	3781460	1.56E-06	0.033676	0.00094736	0.012157	1.59E-07
2163	467800	3781460	-2.48E-07	0	0	0	-2.83E-08
2164	467900	3781460	-2.11E-07	0	0	0	-2.41E-08
2165	468000	3781460	-1.81E-07	0	0	0	-2.06E-08
2166	468100	3781460	-1.57E-07	0	0	0	-1.79E-08
2167	468200	3781460	-1.37E-07	0	0	0	-1.56E-08
2168	468300	3781460	-1.20E-07	0	0	0	-1.37E-08
2169	468400	3781460	-1.06E-07	0	0	0	-1.21E-08
2170	468500	3781460	-9.42E-08	0	0	0	-1.08E-08
2171	464900	3781560	-1.80E-07	0	0	0	-2.06E-08
2172	465000	3781560	-1.42E-07	0	0	0	-1.62E-08
2173	465100	3781560	-8.30E-08	0	6.53E-05	0	-9.48E-09
2174	465200	3781560	2.80E-08	0.00060313	6.92E-05	0.00021774	2.85E-09
2175	465300	3781560	2.07E-07	0.0044669	0.00030726	0.0016126	2.11E-08
2176	465400	3781560	4.70E-07	0.010122	0.00058314	0.0036542	4.79E-08
2177	465500	3781560	8.53E-07	0.018386	0.00082916	0.0066376	8.69E-08
2178	465600	3781560	1.44E-06	0.030959	0.0016315	0.011176	1.46E-07
2179	467800	3781560	-2.11E-07	0	0	0	-2.41E-08
2180	467900	3781560	-1.81E-07	0	0	0	-2.06E-08
2181	468000	3781560	-1.56E-07	0	0	0	-1.78E-08
2182	468100	3781560	-1.36E-07	0	0	0	-1.55E-08
2183	468200	3781560	-1.19E-07	0	0	0	-1.36E-08
2184	468300	3781560	-1.05E-07	0	0	0	-1.20E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2185	468400	3781560	-9.28E-08	0	0	0	-1.06E-08
2186	468500	3781560	-8.26E-08	0	0	0	-9.44E-09
2187	464900	3781660	-8.17E-08	0	5.70E-05	0	-9.33E-09
2188	465000	3781660	-2.89E-08	0	0.00014083	0	-3.31E-09
2189	465100	3781660	7.99E-08	0.0017229	0.00017978	0.00062197	8.14E-09
2190	465200	3781660	1.43E-07	0.0030843	0.00018	0.0011135	1.46E-08
2191	465300	3781660	3.29E-07	0.0070846	0.00073834	0.0025576	3.35E-08
2192	465400	3781660	5.86E-07	0.01264	0.0011131	0.0045631	5.98E-08
2193	465500	3781660	9.26E-07	0.019957	0.0012465	0.0072048	9.43E-08
2194	465600	3781660	1.40E-06	0.030143	0.0017136	0.010882	1.43E-07
2195	467800	3781660	-1.85E-07	0	0	0	-2.11E-08
2196	467900	3781660	-1.60E-07	0	0	0	-1.82E-08
2197	468000	3781660	-1.39E-07	0	0	0	-1.59E-08
2198	468100	3781660	-1.22E-07	0	0	0	-1.39E-08
2199	468200	3781660	-1.07E-07	0	0	0	-1.23E-08
2200	468300	3781660	-9.50E-08	0	0	0	-1.09E-08
2201	468400	3781660	-8.43E-08	0	0	0	-9.62E-09
2202	468500	3781660	-7.53E-08	0	0	0	-8.60E-09
2203	464900	3781760	2.96E-07	0.0063801	0.00021879	0.0023033	3.02E-08
2204	465000	3781760	4.43E-07	0.0095411	0.00036951	0.0034444	4.51E-08
2205	465100	3781760	5.28E-07	0.011373	0.00074082	0.0041057	5.38E-08
2206	465200	3781760	6.21E-07	0.013391	0.0009693	0.0048344	6.33E-08
2207	465300	3781760	5.96E-07	0.012856	0.00074281	0.004641	6.08E-08
2208	465400	3781760	7.47E-07	0.016101	0.0011367	0.0058125	7.61E-08
2209	465500	3781760	9.70E-07	0.020909	0.0014669	0.0075485	9.88E-08
2210	465600	3781760	1.22E-06	0.026361	0.0015836	0.0095167	1.25E-07
2211	467800	3781760	-1.64E-07	0	0	0	-1.87E-08
2212	467900	3781760	-1.40E-07	0	0	0	-1.60E-08
2213	468000	3781760	-1.25E-07	0	0	0	-1.43E-08
2214	468100	3781760	-1.11E-07	0	0	0	-1.27E-08
2215	468200	3781760	-9.82E-08	0	0	0	-1.12E-08
2216	468300	3781760	-8.75E-08	0	0	0	-9.99E-09
2217	468400	3781760	-7.82E-08	0	0	0	-8.94E-09
2218	468500	3781760	-7.02E-08	0	0	0	-8.02E-09
2219	464900	3781860	4.91E-07	0.010582	0.00064836	0.0038203	5.00E-08
2220	465000	3781860	5.68E-07	0.012239	0.00078795	0.0044184	5.79E-08
2221	465100	3781860	6.29E-07	0.013562	0.00069427	0.0048962	6.41E-08
2222	465200	3781860	6.35E-07	0.013696	0.00088684	0.0049445	6.47E-08
2223	465300	3781860	6.71E-07	0.014456	0.0012784	0.0052187	6.83E-08
2224	465400	3781860	7.48E-07	0.016128	0.0011993	0.0058222	7.62E-08
2225	465500	3781860	8.62E-07	0.01859	0.0014355	0.0067112	8.79E-08
2226	465600	3781860	1.04E-06	0.022501	0.0018086	0.0081231	1.06E-07
2227	467800	3781860	-1.27E-07	0	0	0	-1.45E-08
2228	467900	3781860	-1.09E-07	0	0	0	-1.25E-08
2229	468000	3781860	-1.14E-07	0	0	0	-1.30E-08
2230	468100	3781860	-1.01E-07	0	0	0	-1.15E-08
2231	468200	3781860	-9.04E-08	0	0	0	-1.03E-08
2232	468300	3781860	-8.08E-08	0	0	0	-9.23E-09
2233	468400	3781860	-7.29E-08	0	0	0	-8.32E-09
2234	468500	3781860	-6.59E-08	0	0	0	-7.53E-09
2235	464900	3781960	4.74E-07	0.010221	0.00048645	0.00369	4.83E-08
2236	465000	3781960	5.10E-07	0.010993	0.00088097	0.0039685	5.20E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2237	465100	3781960	5.11E-07	0.011014	0.0008775	0.0039762	5.21E-08
2238	465200	3781960	5.14E-07	0.011073	0.0010567	0.0039974	5.23E-08
2239	465300	3781960	5.44E-07	0.011736	0.0010454	0.0042367	5.55E-08
2240	465400	3781960	6.08E-07	0.013107	0.0013044	0.0047319	6.20E-08
2241	465500	3781960	7.04E-07	0.015166	0.0017711	0.0054752	7.17E-08
2242	465600	3781960	8.28E-07	0.017849	0.0016854	0.0064438	8.44E-08
2243	467800	3781960	-9.63E-08	0	0	0	-1.10E-08
2244	467900	3781960	-8.95E-08	0	0	0	-1.02E-08
2245	468000	3781960	-8.65E-08	0	0	0	-9.88E-09
2246	468100	3781960	-8.20E-08	0	0	0	-9.37E-09
2247	468200	3781960	-7.46E-08	0	0	0	-8.52E-09
2248	468300	3781960	-7.45E-08	0	0	0	-8.51E-09
2249	468400	3781960	-6.75E-08	0	0	0	-7.71E-09
2250	468500	3781960	-6.15E-08	0	0	0	-7.03E-09
2251	464900	3782060	3.83E-07	0.0082612	0.00071372	0.0029824	3.91E-08
2252	465000	3782060	3.83E-07	0.0082486	0.0010932	0.0029778	3.90E-08
2253	465100	3782060	3.82E-07	0.0082368	0.00096129	0.0029735	3.89E-08
2254	465200	3782060	4.02E-07	0.0086625	0.001015	0.0031272	4.10E-08
2255	465300	3782060	4.41E-07	0.0095133	0.0011384	0.0034344	4.50E-08
2256	465400	3782060	4.98E-07	0.010746	0.0016829	0.0038793	5.08E-08
2257	465500	3782060	5.69E-07	0.012274	0.00142	0.0044312	5.80E-08
2258	465600	3782060	6.63E-07	0.014283	0.0016224	0.0051562	6.75E-08
2259	467800	3782060	-7.19E-08	0	0	0	-8.21E-09
2260	467900	3782060	-7.10E-08	0	0	0	-8.11E-09
2261	468000	3782060	-6.88E-08	0	0	0	-7.86E-09
2262	468100	3782060	-6.58E-08	0	0	0	-7.52E-09
2263	468200	3782060	-6.45E-08	0	0	0	-7.37E-09
2264	468300	3782060	-6.90E-08	0	0	0	-7.88E-09
2265	468400	3782060	-6.22E-08	0	0	0	-7.10E-09
2266	468500	3782060	-5.69E-08	0	0	0	-6.49E-09
2267	464900	3782160	2.86E-07	0.0061568	0.00091904	0.0022227	2.91E-08
2268	465000	3782160	2.88E-07	0.0062063	0.00080878	0.0022405	2.93E-08
2269	465100	3782160	3.03E-07	0.006529	0.00096822	0.002357	3.09E-08
2270	465200	3782160	3.30E-07	0.0071126	0.0011661	0.0025677	3.36E-08
2271	465300	3782160	3.66E-07	0.0078981	0.0013531	0.0028513	3.73E-08
2272	465400	3782160	4.12E-07	0.0088811	0.001117	0.0032061	4.20E-08
2273	465500	3782160	4.67E-07	0.010068	0.00148	0.0036346	4.76E-08
2274	465600	3782160	5.30E-07	0.011429	0.0018092	0.0041261	5.40E-08
2275	467800	3782160	-2.08E-08	0	0	0	-2.38E-09
2276	467900	3782160	-5.36E-08	0	0	0	-6.12E-09
2277	468000	3782160	-5.48E-08	0	0	0	-6.25E-09
2278	468100	3782160	-5.26E-08	0	0	0	-6.01E-09
2279	468200	3782160	-5.23E-08	0	0	0	-5.97E-09
2280	468300	3782160	-5.31E-08	0	0	0	-6.06E-09
2281	468400	3782160	-5.74E-08	0	0	0	-6.56E-09
2282	468500	3782160	-5.24E-08	0	0	0	-5.98E-09
2283	464900	3782260	2.18E-07	0.0047023	0.00079989	0.0016976	2.22E-08
2284	465000	3782260	2.34E-07	0.0050374	0.00067727	0.0018185	2.38E-08
2285	465100	3782260	2.54E-07	0.0054743	0.0010878	0.0019763	2.59E-08
2286	465200	3782260	2.78E-07	0.0059876	0.0011145	0.0021616	2.83E-08
2287	465300	3782260	3.05E-07	0.0065721	0.0009061	0.0023726	3.11E-08
2288	465400	3782260	3.43E-07	0.0073933	0.0012211	0.002669	3.50E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2289	465500	3782260	3.81E-07	0.0082052	0.0016797	0.0029621	3.88E-08
2290	465600	3782260	4.12E-07	0.0088847	0.0013875	0.0032074	4.20E-08
2291	467800	3782260	1.55E-09	3.35E-05	0	1.21E-05	1.58E-10
2292	467900	3782260	-8.51E-10	0	0	0	-9.72E-11
2293	468000	3782260	-1.37E-08	0	0	0	-1.56E-09
2294	468100	3782260	-3.99E-08	0	0	0	-4.55E-09
2295	468200	3782260	-3.99E-08	0	0	0	-4.56E-09
2296	468300	3782260	-4.09E-08	0	0	0	-4.67E-09
2297	468400	3782260	-4.28E-08	0	0	0	-4.89E-09
2298	468500	3782260	-4.42E-08	0	0	0	-5.05E-09
2299	464900	3782360	1.83E-07	0.0039497	0.00081072	0.0014259	1.87E-08
2300	465000	3782360	2.00E-07	0.004309	0.00096191	0.0015556	2.04E-08
2301	465100	3782360	2.16E-07	0.0046611	0.0010179	0.0016827	2.20E-08
2302	465200	3782360	2.31E-07	0.004989	0.0007009	0.0018011	2.36E-08
2303	465300	3782360	2.58E-07	0.0055721	0.001084	0.0020116	2.63E-08
2304	465400	3782360	2.89E-07	0.006226	0.0012767	0.0022477	2.94E-08
2305	465500	3782360	3.12E-07	0.0067232	0.0014424	0.0024271	3.18E-08
2306	465600	3782360	3.24E-07	0.0069951	0.0012693	0.0025253	3.31E-08
2307	467800	3782360	6.29E-09	0.00013568	0	4.90E-05	6.41E-10
2308	467900	3782360	8.05E-09	0.00017358	0	6.27E-05	8.21E-10
2309	468000	3782360	-9.06E-09	0	0	0	-1.03E-09
2310	468100	3782360	-2.39E-08	0	0	0	-2.73E-09
2311	468200	3782360	-3.14E-08	0	0	0	-3.58E-09
2312	468300	3782360	-3.32E-08	0	0	0	-3.79E-09
2313	468400	3782360	-3.63E-08	0	0	0	-4.15E-09
2314	468500	3782360	-3.79E-08	0	0	0	-4.33E-09
2315	464900	3782460	1.58E-07	0.0034112	0.00086892	0.0012315	1.61E-08
2316	465000	3782460	1.68E-07	0.0036314	0.00093623	0.001311	1.72E-08
2317	465100	3782460	1.81E-07	0.0039085	0.00050605	0.001411	1.85E-08
2318	465200	3782460	1.97E-07	0.0042403	0.00099871	0.0015308	2.00E-08
2319	465300	3782460	2.23E-07	0.0048058	0.0010416	0.0017349	2.27E-08
2320	465400	3782460	2.42E-07	0.0052225	0.0012075	0.0018854	2.47E-08
2321	465500	3782460	2.50E-07	0.0053999	0.00094242	0.0019494	2.55E-08
2322	465600	3782460	2.57E-07	0.0055391	0.0015518	0.0019997	2.62E-08
2323	467800	3782460	2.54E-08	0.00054655	0	0.00019731	2.58E-09
2324	467900	3782460	6.17E-09	0.00013293	0	4.80E-05	6.28E-10
2325	468000	3782460	-4.48E-10	0	0	0	-5.11E-11
2326	468100	3782460	-6.94E-09	0	0	0	-7.93E-10
2327	468200	3782460	-1.58E-08	0	0	0	-1.80E-09
2328	468300	3782460	-2.59E-08	0	0	0	-2.96E-09
2329	468400	3782460	-2.89E-08	0	0	0	-3.30E-09
2330	468500	3782460	-3.07E-08	0	0	0	-3.51E-09
2331	464900	3782560	1.35E-07	0.0029154	0.00079854	0.0010525	1.38E-08
2332	465000	3782560	1.41E-07	0.0030492	0.00052165	0.0011008	1.44E-08
2333	465100	3782560	1.56E-07	0.0033532	0.00089548	0.0012105	1.59E-08
2334	465200	3782560	1.74E-07	0.0037503	0.00075177	0.0013539	1.77E-08
2335	465300	3782560	1.92E-07	0.0041354	0.0011856	0.0014929	1.96E-08
2336	465400	3782560	2.01E-07	0.0043348	0.0011978	0.0015649	2.05E-08
2337	465500	3782560	2.02E-07	0.0043548	0.0014507	0.0015721	2.06E-08
2338	465600	3782560	2.06E-07	0.0044419	0.0010787	0.0016036	2.10E-08
2339	467800	3782560	2.64E-08	0.0005688	0	0.00020534	2.69E-09
2340	467900	3782560	2.12E-08	0.00045674	0	0.00016489	2.16E-09

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2341	468000	3782560	1.21E-08	0.00026174	0	9.45E-05	1.24E-09
2342	468100	3782560	6.93E-09	0.00014941	0	5.39E-05	7.06E-10
2343	468200	3782560	-5.87E-09	0	0	0	-6.71E-10
2344	468300	3782560	-1.86E-08	0	0	0	-2.12E-09
2345	468400	3782560	-2.06E-08	0	0	0	-2.35E-09
2346	468500	3782560	-2.02E-08	0	0	0	-2.31E-09
2347	464900	3782660	1.14E-07	0.0024611	0.00054822	0.00088849	1.16E-08
2348	465000	3782660	1.22E-07	0.002632	0.00079571	0.00095016	1.24E-08
2349	465100	3782660	1.39E-07	0.002992	0.00070045	0.0010802	1.41E-08
2350	465200	3782660	1.55E-07	0.0033345	0.0012496	0.0012038	1.58E-08
2351	465300	3782660	1.64E-07	0.0035287	0.001077	0.0012739	1.67E-08
2352	465400	3782660	1.64E-07	0.00354	0.0010026	0.001278	1.67E-08
2353	465500	3782660	1.64E-07	0.0035413	0.0010231	0.0012785	1.67E-08
2354	465600	3782660	1.71E-07	0.0036927	0.0011938	0.0013331	1.75E-08
2355	467800	3782660	3.48E-08	0.00074952	0	0.00027058	3.54E-09
2356	467900	3782660	2.57E-08	0.00055507	0	0.00020038	2.62E-09
2357	468000	3782660	1.87E-08	0.00040236	0	0.00014526	1.90E-09
2358	468100	3782660	1.17E-08	0.00025158	0	9.08E-05	1.19E-09
2359	468200	3782660	7.81E-09	0.00016836	0	6.08E-05	7.96E-10
2360	468300	3782660	1.70E-08	0.00036638	0	0.00013227	1.73E-09
2361	468400	3782660	6.12E-09	0.00013183	0	4.76E-05	6.23E-10
2362	468500	3782660	7.57E-09	0.00016314	0	5.89E-05	7.71E-10
2363	464900	3782760	9.90E-08	0.0021332	0.00067497	0.00077011	1.01E-08
2364	465000	3782760	1.11E-07	0.0023842	0.00072583	0.00086073	1.13E-08
2365	465100	3782760	1.25E-07	0.002688	0.0012091	0.00097039	1.27E-08
2366	465200	3782760	1.34E-07	0.0028904	0.00086112	0.0010435	1.37E-08
2367	465300	3782760	1.36E-07	0.0029308	0.0010416	0.001058	1.39E-08
2368	465400	3782760	1.34E-07	0.0028926	0.00096448	0.0010443	1.37E-08
2369	465500	3782760	1.36E-07	0.0029363	0.0011553	0.00106	1.39E-08
2370	465600	3782760	1.45E-07	0.003131	0.00086203	0.0011303	1.48E-08
2371	465700	3782760	1.57E-07	0.003376	0.00029758	0.0012188	1.60E-08
2372	465800	3782760	1.62E-07	0.003485	0.00068565	0.0012581	1.65E-08
2373	465900	3782760	1.61E-07	0.0034771	0.00073462	0.0012553	1.64E-08
2374	466000	3782760	1.60E-07	0.0034559	0	0.0012476	1.63E-08
2375	466100	3782760	1.61E-07	0.0034804	0.0012081	0.0012564	1.65E-08
2376	466200	3782760	1.57E-07	0.0033911	0.00079189	0.0012242	1.60E-08
2377	466300	3782760	1.57E-07	0.0033895	0.00021596	0.0012236	1.60E-08
2378	466400	3782760	1.48E-07	0.003189	0.00053568	0.0011512	1.51E-08
2379	466500	3782760	1.32E-07	0.0028456	0	0.0010273	1.35E-08
2380	466600	3782760	1.12E-07	0.0024117	0	0.00087065	1.14E-08
2381	466700	3782760	9.89E-08	0.0021329	0	0.00077001	1.01E-08
2382	466800	3782760	9.24E-08	0.0019915	6.65E-05	0.00071894	9.41E-09
2383	466900	3782760	8.52E-08	0.0018366	0	0.00066302	8.68E-09
2384	467000	3782760	8.54E-08	0.001841	0	0.00066461	8.70E-09
2385	467100	3782760	8.61E-08	0.0018555	0	0.00066986	8.77E-09
2386	467200	3782760	6.92E-08	0.0014924	0	0.00053879	7.06E-09
2387	467300	3782760	6.32E-08	0.0013623	0	0.00049179	6.44E-09
2388	467400	3782760	5.42E-08	0.0011678	0	0.00042159	5.52E-09
2389	467500	3782760	4.49E-08	0.00096787	0	0.00034941	4.58E-09
2390	467600	3782760	4.39E-08	0.00094617	0	0.00034158	4.47E-09
2391	467700	3782760	4.02E-08	0.00086707	0	0.00031302	4.10E-09
2392	467800	3782760	3.66E-08	0.00078907	0	0.00028486	3.73E-09

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2393	467900	3782760	3.26E-08	0.00070255	0	0.00025363	3.32E-09
2394	468000	3782760	2.37E-08	0.00051112	0	0.00018452	2.42E-09
2395	468100	3782760	1.34E-08	0.00028783	0	0.00010391	1.36E-09
2396	468200	3782760	1.05E-08	0.00022549	0	8.14E-05	1.07E-09
2397	468300	3782760	1.27E-08	0.00027328	0	9.87E-05	1.29E-09
2398	468400	3782760	9.48E-09	0.00020434	0	7.38E-05	9.66E-10
2399	468500	3782760	-2.73E-09	0	0	0	-3.12E-10
2400	464900	3782860	9.04E-08	0.0019484	0.00070989	0.00070338	9.21E-09
2401	465000	3782860	1.02E-07	0.0022082	0.00098213	0.00079717	1.04E-08
2402	465100	3782860	1.12E-07	0.0024059	0.00064627	0.00086856	1.14E-08
2403	465200	3782860	1.14E-07	0.0024477	0.0010421	0.00088363	1.16E-08
2404	465300	3782860	1.11E-07	0.002398	0.00084209	0.00086569	1.13E-08
2405	465400	3782860	1.12E-07	0.0024068	0.00086043	0.00086886	1.14E-08
2406	465500	3782860	1.17E-07	0.0025284	0.00079071	0.00091278	1.20E-08
2407	465600	3782860	1.26E-07	0.0027061	0.00077721	0.00097693	1.28E-08
2408	465700	3782860	1.26E-07	0.0027223	0.00051521	0.00098278	1.29E-08
2409	465800	3782860	1.26E-07	0.002724	0.001031	0.00098338	1.29E-08
2410	465900	3782860	1.36E-07	0.0029346	0.00066807	0.0010594	1.39E-08
2411	466000	3782860	1.35E-07	0.0029127	0	0.0010515	1.38E-08
2412	466100	3782860	1.34E-07	0.0028805	0.001203	0.0010399	1.36E-08
2413	466200	3782860	1.29E-07	0.0027797	0.00074078	0.0010035	1.31E-08
2414	466300	3782860	1.20E-07	0.002577	0.0004569	0.00093033	1.22E-08
2415	466400	3782860	1.18E-07	0.0025361	0.00089363	0.00091556	1.20E-08
2416	466500	3782860	1.14E-07	0.0024488	0	0.00088403	1.16E-08
2417	466600	3782860	9.53E-08	0.0020549	0	0.00074185	9.71E-09
2418	466700	3782860	8.24E-08	0.0017759	0	0.00064111	8.40E-09
2419	466800	3782860	7.69E-08	0.0016578	0	0.00059848	7.84E-09
2420	466900	3782860	6.59E-08	0.001421	0	0.00051301	6.72E-09
2421	467000	3782860	5.60E-08	0.0012071	0	0.00043577	5.71E-09
2422	467100	3782860	5.13E-08	0.0011057	0.0001726	0.00039918	5.23E-09
2423	467200	3782860	6.94E-08	0.0014963	0	0.00054017	7.07E-09
2424	467300	3782860	5.64E-08	0.0012167	0	0.00043924	5.75E-09
2425	467400	3782860	5.11E-08	0.0011008	0	0.0003974	5.20E-09
2426	467500	3782860	4.38E-08	0.00094397	0	0.00034078	4.46E-09
2427	467600	3782860	3.64E-08	0.00078522	0	0.00028347	3.71E-09
2428	467700	3782860	3.52E-08	0.00075886	0	0.00027395	3.59E-09
2429	467800	3782860	3.41E-08	0.00073524	0	0.00026543	3.48E-09
2430	467900	3782860	3.54E-08	0.00076408	0	0.00027584	3.61E-09
2431	468000	3782860	2.99E-08	0.00064405	0	0.00023251	3.04E-09
2432	468100	3782860	2.05E-08	0.00044109	0	0.00015924	2.09E-09
2433	468200	3782860	1.72E-08	0.00036995	0	0.00013356	1.75E-09
2434	468300	3782860	1.38E-08	0.0002969	0	0.00010718	1.40E-09
2435	468400	3782860	9.48E-09	0.00020434	0	7.38E-05	9.66E-10
2436	468500	3782860	7.94E-09	0.00017111	0	6.18E-05	8.09E-10
2437	464900	3782960	8.46E-08	0.0018245	0.00074905	0.00065866	8.63E-09
2438	465000	3782960	9.26E-08	0.0019964	0.00075646	0.00072073	9.44E-09
2439	465100	3782960	9.45E-08	0.0020371	0.00081713	0.0007354	9.63E-09
2440	465200	3782960	9.20E-08	0.001983	0.00084547	0.00071587	9.37E-09
2441	465300	3782960	9.19E-08	0.0019805	0.00074093	0.00071498	9.36E-09
2442	465400	3782960	9.59E-08	0.002067	0.00089197	0.00074621	9.77E-09
2443	465500	3782960	1.02E-07	0.0021939	0.00078399	0.00079202	1.04E-08
2444	465600	3782960	9.84E-08	0.0021208	0.0003438	0.00076564	1.00E-08

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2445	465700	3782960	1.04E-07	0.0022486	0.0006595	0.00081175	1.06E-08
2446	465800	3782960	1.05E-07	0.0022738	0.00089302	0.00082087	1.07E-08
2447	465900	3782960	1.02E-07	0.0021975	0.00024721	0.00079331	1.04E-08
2448	466000	3782960	1.15E-07	0.0024754	0.00016106	0.00089365	1.17E-08
2449	466100	3782960	1.14E-07	0.0024548	0.0010704	0.00088621	1.16E-08
2450	466200	3782960	1.10E-07	0.0023752	0.00078458	0.00085746	1.12E-08
2451	466300	3782960	1.04E-07	0.0022527	0.00045407	0.00081324	1.07E-08
2452	466400	3782960	1.07E-07	0.0023158	0.00090527	0.00083604	1.09E-08
2453	466500	3782960	9.39E-08	0.0020239	0.00011347	0.00073064	9.57E-09
2454	466600	3782960	8.05E-08	0.0017363	0	0.00062683	8.21E-09
2455	466700	3782960	7.22E-08	0.0015562	0	0.00056179	7.36E-09
2456	466800	3782960	6.34E-08	0.0013667	9.90E-05	0.00049338	6.46E-09
2457	466900	3782960	6.01E-08	0.0012966	0.00012641	0.00046809	6.13E-09
2458	467000	3782960	5.15E-08	0.001111	0	0.00040107	5.25E-09
2459	467100	3782960	4.55E-08	0.0009805	2.11E-06	0.00035397	4.64E-09
2460	467200	3782960	4.80E-08	0.0010354	0.00016966	0.0003738	4.90E-09
2461	467300	3782960	4.81E-08	0.0010365	5.07E-05	0.0003742	4.90E-09
2462	467400	3782960	4.48E-08	0.00096649	8.64E-05	0.00034891	4.57E-09
2463	467500	3782960	4.00E-08	0.0008624	0	0.00031133	4.08E-09
2464	467600	3782960	3.39E-08	0.00073167	0	0.00026414	3.46E-09
2465	467700	3782960	3.14E-08	0.00067591	0	0.00024401	3.20E-09
2466	467800	3782960	2.96E-08	0.00063911	0	0.00023072	3.02E-09
2467	467900	3782960	1.79E-08	0.00038643	0	0.00013951	1.83E-09
2468	468000	3782960	1.36E-08	0.00029223	0	0.0001055	1.38E-09
2469	468100	3782960	2.67E-08	0.00057567	0	0.00020782	2.72E-09
2470	468200	3782960	2.14E-08	0.00046086	0	0.00016638	2.18E-09
2471	468300	3782960	1.77E-08	0.00038176	0	0.00013782	1.80E-09
2472	468400	3782960	1.49E-08	0.00032107	0	0.00011591	1.52E-09
2473	468500	3782960	1.27E-08	0.0002741	0	9.90E-05	1.30E-09
2474	464900	3783060	7.79E-08	0.0016787	0.00077156	0.00060601	7.94E-09
2475	465000	3783060	8.03E-08	0.0017308	0.00065167	0.00062485	8.18E-09
2476	465100	3783060	7.67E-08	0.0016545	0.00097561	0.00059729	7.82E-09
2477	465200	3783060	7.48E-08	0.0016116	0.00061547	0.00058182	7.62E-09
2478	465300	3783060	7.70E-08	0.0016594	0.00087052	0.00059907	7.85E-09
2479	465400	3783060	8.17E-08	0.0017613	0.00045517	0.00063586	8.33E-09
2480	465500	3783060	7.83E-08	0.0016883	0.00078789	0.00060948	7.98E-09
2481	465600	3783060	8.50E-08	0.0018327	0.00022159	0.00066163	8.66E-09
2482	465700	3783060	9.02E-08	0.0019445	0.00064087	0.00070199	9.19E-09
2483	465800	3783060	9.05E-08	0.0019517	0.00096439	0.00070457	9.23E-09
2484	465900	3783060	9.59E-08	0.0020667	4.21E-05	0.00074611	9.77E-09
2485	466000	3783060	9.22E-08	0.0019885	0.00058049	0.00071785	9.40E-09
2486	466100	3783060	9.64E-08	0.0020775	0.00092736	0.00074998	9.82E-09
2487	466200	3783060	9.54E-08	0.0020574	0.00090592	0.00074274	9.73E-09
2488	466300	3783060	9.23E-08	0.0019901	0.00037216	0.00071845	9.41E-09
2489	466400	3783060	8.97E-08	0.0019344	0.00096496	0.00069832	9.14E-09
2490	466500	3783060	8.32E-08	0.0017937	0.00032531	0.00064756	8.48E-09
2491	466600	3783060	7.12E-08	0.0015356	0	0.00055435	7.26E-09
2492	466700	3783060	5.99E-08	0.0012914	0	0.00046621	6.11E-09
2493	466800	3783060	5.55E-08	0.0011975	0	0.0004323	5.66E-09
2494	466900	3783060	5.45E-08	0.001175	7.44E-05	0.00042417	5.55E-09
2495	467000	3783060	4.79E-08	0.0010335	0	0.00037311	4.89E-09
2496	467100	3783060	4.19E-08	0.00090305	6.92E-05	0.00032601	4.27E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2497	467200	3783060	4.26E-08	0.00091898	0.00025428	0.00033176	4.34E-09
2498	467300	3783060	4.40E-08	0.00094809	0.00018637	0.00034227	4.48E-09
2499	467400	3783060	4.25E-08	0.00091596	0	0.00033067	4.33E-09
2500	467500	3783060	3.90E-08	0.00084015	0	0.0003033	3.97E-09
2501	467600	3783060	2.91E-08	0.00062675	0	0.00022626	2.96E-09
2502	467700	3783060	2.65E-08	0.00057072	0	0.00020604	2.70E-09
2503	467800	3783060	2.46E-08	0.0005298	0	0.00019126	2.50E-09
2504	467900	3783060	2.25E-08	0.00048503	0	0.0001751	2.29E-09
2505	468000	3783060	2.44E-08	0.0005265	0	0.00019007	2.49E-09
2506	468100	3783060	2.16E-08	0.00046663	0	0.00016846	2.21E-09
2507	468200	3783060	2.33E-08	0.00050234	0	0.00018135	2.37E-09
2508	468300	3783060	2.13E-08	0.00045976	0	0.00016598	2.17E-09
2509	468400	3783060	1.81E-08	0.00039055	0	0.00014099	1.85E-09
2510	468500	3783060	1.50E-08	0.00032244	0	0.0001164	1.52E-09
2511	464900	3783160	6.82E-08	0.0014699	0.00040816	0.00053066	6.95E-09
2512	465000	3783160	6.58E-08	0.0014194	0.0010032	0.00051241	6.71E-09
2513	465100	3783160	6.21E-08	0.0013384	0.00067634	0.00048316	6.33E-09
2514	465200	3783160	6.13E-08	0.0013224	0.00074702	0.00047741	6.25E-09
2515	465300	3783160	6.66E-08	0.001435	0.00068237	0.00051806	6.78E-09
2516	465400	3783160	7.05E-08	0.0015202	0.00070901	0.0005488	7.19E-09
2517	465500	3783160	7.01E-08	0.0015108	0.00047752	0.00054543	7.14E-09
2518	465600	3783160	7.54E-08	0.0016265	0.00029788	0.00058717	7.69E-09
2519	465700	3783160	7.83E-08	0.0016874	0.00039829	0.00060918	7.98E-09
2520	465800	3783160	8.87E-08	0.0019121	0.0006933	0.00069029	9.04E-09
2521	465900	3783160	7.83E-08	0.0016885	0.00013592	0.00060958	7.98E-09
2522	466000	3783160	7.48E-08	0.0016125	0.0006067	0.00058212	7.62E-09
2523	466100	3783160	7.81E-08	0.0016839	0.00073049	0.00060789	7.96E-09
2524	466200	3783160	8.33E-08	0.0017948	0.00069832	0.00064795	8.49E-09
2525	466300	3783160	8.11E-08	0.0017484	0.00040659	0.0006312	8.27E-09
2526	466400	3783160	7.93E-08	0.0017097	0.00083653	0.00061722	8.08E-09
2527	466500	3783160	7.43E-08	0.0016009	0.00048344	0.00057795	7.57E-09
2528	466600	3783160	6.36E-08	0.0013716	0	0.00049516	6.48E-09
2529	466700	3783160	5.44E-08	0.001173	0	0.00042347	5.55E-09
2530	466800	3783160	4.97E-08	0.0010711	0	0.00038669	5.06E-09
2531	466900	3783160	4.89E-08	0.0010549	0.00013329	0.00038084	4.99E-09
2532	467000	3783160	4.45E-08	0.0009588	8.30E-05	0.00034614	4.53E-09
2533	467100	3783160	3.95E-08	0.00085114	0	0.00030727	4.02E-09
2534	467200	3783160	3.84E-08	0.00082752	6.40E-05	0.00029874	3.91E-09
2535	467300	3783160	3.87E-08	0.00083411	0.00019162	0.00030112	3.94E-09
2536	467400	3783160	4.03E-08	0.00086899	0	0.00031371	4.11E-09
2537	467500	3783160	3.47E-08	0.00074815	0.00011994	0.00027009	3.54E-09
2538	467600	3783160	2.99E-08	0.00064378	0	0.00023241	3.04E-09
2539	467700	3783160	2.53E-08	0.00054628	0	0.00019721	2.58E-09
2540	467800	3783160	2.35E-08	0.00050728	0	0.00018313	2.40E-09
2541	467900	3783160	2.21E-08	0.00047597	0	0.00017183	2.25E-09
2542	468000	3783160	2.01E-08	0.00043422	0	0.00015676	2.05E-09
2543	468100	3783160	2.02E-08	0.0004345	0	0.00015686	2.05E-09
2544	468200	3783160	2.06E-08	0.00044411	0	0.00016033	2.10E-09
2545	468300	3783160	2.09E-08	0.00045125	0	0.00016291	2.13E-09
2546	468400	3783160	2.04E-08	0.00043944	0	0.00015864	2.08E-09
2547	468500	3783160	1.81E-08	0.0003911	0	0.00014119	1.85E-09
2548	464900	3783260	5.71E-08	0.0012318	0.00080842	0.00044469	5.82E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2549	465000	3783260	5.32E-08	0.0011472	0.00056719	0.00041415	5.42E-09
2550	465100	3783260	5.08E-08	0.0010942	0.00057873	0.00039502	5.17E-09
2551	465200	3783260	5.33E-08	0.001148	0.00059811	0.00041445	5.43E-09
2552	465300	3783260	5.85E-08	0.001262	0.00037503	0.0004556	5.97E-09
2553	465400	3783260	6.45E-08	0.00139	0.00062461	0.0005018	6.57E-09
2554	465500	3783260	6.43E-08	0.0013873	0.00018412	0.00050081	6.56E-09
2555	465600	3783260	6.77E-08	0.0014598	0.00044239	0.00052699	6.90E-09
2556	465700	3783260	7.29E-08	0.0015707	0.00062459	0.00056704	7.43E-09
2557	465800	3783260	6.88E-08	0.0014842	0.00052372	0.00053581	7.02E-09
2558	465900	3783260	6.41E-08	0.0013809	0.00049847	0.00049853	6.53E-09
2559	466000	3783260	6.24E-08	0.0013444	0.00058625	0.00048534	6.36E-09
2560	466100	3783260	7.44E-08	0.0016037	0.00054824	0.00057894	7.58E-09
2561	466200	3783260	7.33E-08	0.0015792	0.00057124	0.00057012	7.47E-09
2562	466300	3783260	7.19E-08	0.0015507	0.00045975	0.00055981	7.33E-09
2563	466400	3783260	7.00E-08	0.0015081	0.00073006	0.00054444	7.13E-09
2564	466500	3783260	6.62E-08	0.0014279	0.00058119	0.00051549	6.75E-09
2565	466600	3783260	5.82E-08	0.0012543	0	0.00045282	5.93E-09
2566	466700	3783260	4.93E-08	0.0010618	0	0.00038332	5.02E-09
2567	466800	3783260	4.41E-08	0.00095056	0	0.00034316	4.49E-09
2568	466900	3783260	4.35E-08	0.00093848	0	0.0003388	4.44E-09
2569	467000	3783260	4.08E-08	0.00087915	0	0.00031738	4.16E-09
2570	467100	3783260	3.62E-08	0.00078056	0	0.00028179	3.69E-09
2571	467200	3783260	3.40E-08	0.00073332	0.00010186	0.00026473	3.47E-09
2572	467300	3783260	3.51E-08	0.00075748	0.00012711	0.00027346	3.58E-09
2573	467400	3783260	3.33E-08	0.00071821	0.0002281	0.00025928	3.40E-09
2574	467500	3783260	3.32E-08	0.00071629	0.00017348	0.00025859	3.39E-09
2575	467600	3783260	3.02E-08	0.00065147	0	0.00023519	3.08E-09
2576	467700	3783260	2.51E-08	0.00054216	0	0.00019572	2.56E-09
2577	467800	3783260	2.27E-08	0.00048833	0	0.00017629	2.31E-09
2578	467900	3783260	2.06E-08	0.00044383	0	0.00016023	2.10E-09
2579	468000	3783260	1.74E-08	0.00037462	0	0.00013524	1.77E-09
2580	468100	3783260	1.58E-08	0.00034139	0	0.00012324	1.61E-09
2581	468200	3783260	1.49E-08	0.00032134	0	0.00011601	1.52E-09
2582	468300	3783260	1.41E-08	0.00030486	0	0.00011006	1.44E-09
2583	468400	3783260	1.35E-08	0.00029058	0	0.0001049	1.37E-09
2584	468500	3783260	1.84E-08	0.00039742	0	0.00014347	1.88E-09
2585	464900	3783360	4.66E-08	0.0010044	0.00069747	0.0003626	4.75E-09
2586	465000	3783360	4.30E-08	0.00092667	0.00050608	0.00033454	4.38E-09
2587	465100	3783360	4.38E-08	0.0009437	0.00077765	0.00034068	4.46E-09
2588	465200	3783360	4.75E-08	0.0010233	0.00058592	0.00036944	4.84E-09
2589	465300	3783360	5.27E-08	0.0011371	0.00060586	0.00041049	5.38E-09
2590	465400	3783360	5.78E-08	0.0012464	0.00062176	0.00044995	5.89E-09
2591	465500	3783360	6.16E-08	0.0013274	0.0001956	0.0004792	6.28E-09
2592	465600	3783360	6.37E-08	0.001373	0.00038131	0.00049566	6.49E-09
2593	465700	3783360	6.01E-08	0.001295	0.00077217	0.0004675	6.12E-09
2594	465800	3783360	5.65E-08	0.0012181	0.00030689	0.00043973	5.76E-09
2595	465900	3783360	5.48E-08	0.0011807	0.00061501	0.00042625	5.58E-09
2596	466000	3783360	6.09E-08	0.0013126	0.00041975	0.00047384	6.21E-09
2597	466100	3783360	6.40E-08	0.0013801	0.00056807	0.00049823	6.52E-09
2598	466200	3783360	6.43E-08	0.0013862	0.00052412	0.00050042	6.55E-09
2599	466300	3783360	6.39E-08	0.0013785	0.00054877	0.00049764	6.52E-09
2600	466400	3783360	6.22E-08	0.0013417	0.00067805	0.00048435	6.34E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2601	466500	3783360	5.91E-08	0.0012749	0.00058546	0.00046026	6.03E-09
2602	466600	3783360	5.29E-08	0.0011398	0	0.00041148	5.39E-09
2603	466700	3783360	4.48E-08	0.00096622	0	0.00034881	4.57E-09
2604	466800	3783360	3.94E-08	0.00085032	0	0.00030697	4.02E-09
2605	466900	3783360	3.94E-08	0.00085004	0	0.00030687	4.02E-09
2606	467000	3783360	3.74E-08	0.00080527	0	0.00029071	3.81E-09
2607	467100	3783360	3.34E-08	0.00072096	0	0.00026027	3.41E-09
2608	467200	3783360	3.04E-08	0.00065641	0	0.00023697	3.10E-09
2609	467300	3783360	3.01E-08	0.00064817	0.00012905	0.000234	3.06E-09
2610	467400	3783360	3.10E-08	0.0006685	0.00021213	0.00024133	3.16E-09
2611	467500	3783360	3.03E-08	0.00065394	0.0002129	0.00023608	3.09E-09
2612	467600	3783360	2.75E-08	0.00059379	0	0.00021436	2.81E-09
2613	467700	3783360	2.37E-08	0.0005114	0	0.00018462	2.42E-09
2614	467800	3783360	2.07E-08	0.00044713	0	0.00016142	2.11E-09
2615	467900	3783360	1.90E-08	0.00041005	0	0.00014803	1.94E-09
2616	468000	3783360	1.69E-08	0.00036336	0	0.00013118	1.72E-09
2617	468100	3783360	1.45E-08	0.00031283	0	0.00011293	1.48E-09
2618	468200	3783360	1.27E-08	0.00027465	0	9.92E-05	1.30E-09
2619	468300	3783360	1.10E-08	0.00023675	0	8.55E-05	1.12E-09
2620	468400	3783360	1.03E-08	0.00022219	0	8.02E-05	1.05E-09
2621	468500	3783360	1.09E-08	0.00023592	0	8.52E-05	1.12E-09
2622	464900	3783460	3.73E-08	0.00080418	0.00048706	0.00029031	3.80E-09
2623	465000	3783460	3.63E-08	0.00078275	0.00066283	0.00028258	3.70E-09
2624	465100	3783460	3.86E-08	0.00083219	0.00041221	0.00030043	3.93E-09
2625	465200	3783460	4.34E-08	0.00093601	0.00038656	0.00033791	4.43E-09
2626	465300	3783460	4.75E-08	0.0010233	0.00052531	0.00036944	4.84E-09
2627	465400	3783460	5.16E-08	0.0011132	0.00017747	0.00040186	5.26E-09
2628	465500	3783460	5.51E-08	0.0011873	0.00022867	0.00042863	5.61E-09
2629	465600	3783460	5.78E-08	0.0012453	0.00037322	0.00044955	5.89E-09
2630	465700	3783460	5.16E-08	0.0011118	0.00058433	0.00040136	5.26E-09
2631	465800	3783460	4.89E-08	0.0010549	0.00018509	0.00038084	4.99E-09
2632	465900	3783460	4.99E-08	0.0010747	0.00060896	0.00038798	5.08E-09
2633	466000	3783460	5.33E-08	0.0011494	0.00032875	0.00041495	5.43E-09
2634	466100	3783460	5.49E-08	0.001184	0.00049105	0.00042744	5.60E-09
2635	466200	3783460	5.78E-08	0.0012458	0.00050312	0.00044975	5.89E-09
2636	466300	3783460	5.72E-08	0.0012337	0.00062995	0.00044539	5.83E-09
2637	466400	3783460	5.50E-08	0.0011857	0.00063299	0.00042804	5.61E-09
2638	466500	3783460	5.27E-08	0.001136	0.00057646	0.00041009	5.37E-09
2639	466600	3783460	4.63E-08	0.00099863	9.60E-05	0.00036051	4.72E-09
2640	466700	3783460	4.13E-08	0.00088987	0	0.00032125	4.21E-09
2641	466800	3783460	3.66E-08	0.00078989	0	0.00028516	3.73E-09
2642	466900	3783460	3.56E-08	0.00076847	0	0.00027742	3.63E-09
2643	467000	3783460	3.43E-08	0.00073853	0	0.00026662	3.49E-09
2644	467100	3783460	3.12E-08	0.00067262	0	0.00024282	3.18E-09
2645	467200	3783460	2.81E-08	0.0006056	0	0.00021863	2.86E-09
2646	467300	3783460	2.70E-08	0.00058198	0.0001939	0.0002101	2.75E-09
2647	467400	3783460	2.73E-08	0.0005894	0.00010454	0.00021278	2.79E-09
2648	467500	3783460	2.76E-08	0.00059489	0.00012675	0.00021476	2.81E-09
2649	467600	3783460	2.62E-08	0.00056578	0.00020847	0.00020425	2.67E-09
2650	467700	3783460	2.28E-08	0.0004919	0	0.00017758	2.33E-09
2651	467800	3783460	2.04E-08	0.00043999	0	0.00015884	2.08E-09
2652	467900	3783460	1.80E-08	0.00038835	0	0.0001402	1.84E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2653	468000	3783460	1.67E-08	0.00036034	0	0.00013009	1.70E-09
2654	468100	3783460	1.49E-08	0.00032134	0	0.00011601	1.52E-09
2655	468200	3783460	1.24E-08	0.00026696	0	9.64E-05	1.26E-09
2656	468300	3783460	9.67E-09	0.00020846	0	7.53E-05	9.85E-10
2657	468400	3783460	8.50E-09	0.00018319	0	6.61E-05	8.66E-10
2658	468500	3783460	6.77E-09	0.00014584	0	5.26E-05	6.89E-10
2659	457900	3772360	2.04E-10	4.39E-06	0	1.59E-06	2.08E-11
2660	458400	3772360	1.78E-10	3.85E-06	4.33E-06	1.39E-06	1.82E-11
2661	458900	3772360	1.02E-10	2.20E-06	6.46E-06	7.93E-07	1.04E-11
2662	459400	3772360	-2.37E-17	0	0	3.64E-13	5.33E-19
2663	459900	3772360	-5.46E-11	0	0	0	-6.23E-12
2664	460400	3772360	-8.73E-11	0	0	0	-9.97E-12
2665	460900	3772360	-1.20E-10	0	1.64E-05	0	-1.37E-11
2666	461400	3772360	-1.96E-10	0	8.79E-06	0	-2.24E-11
2667	461900	3772360	-3.38E-10	0	0	0	-3.86E-11
2668	462400	3772360	-4.80E-10	0	7.18E-07	0	-5.49E-11
2669	462900	3772360	-5.79E-10	0	0	0	-6.61E-11
2670	463400	3772360	-7.10E-10	0	5.09E-06	0	-8.10E-11
2671	463900	3772360	-9.17E-10	0	1.51E-05	0	-1.05E-10
2672	464400	3772360	-1.14E-09	0	0	0	-1.30E-10
2673	464900	3772360	-1.30E-09	0	0	0	-1.48E-10
2674	465400	3772360	-1.47E-09	0	0	0	-1.68E-10
2675	465900	3772360	-1.64E-09	0	0	0	-1.87E-10
2676	466400	3772360	-1.78E-09	0	3.78E-06	0	-2.03E-10
2677	466900	3772360	-1.90E-09	0	0	0	-2.17E-10
2678	467400	3772360	-2.03E-09	0	0	0	-2.32E-10
2679	467900	3772360	-2.14E-09	0	1.64E-05	0	-2.44E-10
2680	468400	3772360	-2.21E-09	0	0	0	-2.52E-10
2681	468900	3772360	-2.24E-09	0	0	0	-2.56E-10
2682	469400	3772360	-2.22E-09	0	0	0	-2.53E-10
2683	469900	3772360	-2.14E-09	0	9.15E-06	0	-2.44E-10
2684	470400	3772360	-2.11E-09	0	3.08E-05	0	-2.41E-10
2685	470900	3772360	-2.08E-09	0	0	0	-2.38E-10
2686	471400	3772360	-2.05E-09	0	0	0	-2.34E-10
2687	471900	3772360	-1.99E-09	0	0	0	-2.27E-10
2688	472400	3772360	-1.90E-09	0	8.24E-06	0	-2.17E-10
2689	472900	3772360	-1.81E-09	0	0	0	-2.07E-10
2690	473400	3772360	-1.71E-09	0	5.56E-06	0	-1.96E-10
2691	473900	3772360	-1.64E-09	0	2.39E-06	0	-1.87E-10
2692	474400	3772360	-1.57E-09	0	8.91E-06	0	-1.80E-10
2693	474900	3772360	-1.51E-09	0	0	0	-1.72E-10
2694	475400	3772360	-1.43E-09	0	0	0	-1.63E-10
2695	457900	3772860	2.68E-10	5.77E-06	7.22E-07	2.08E-06	2.73E-11
2696	458400	3772860	2.55E-10	5.49E-06	0	1.98E-06	2.60E-11
2697	458900	3772860	2.04E-10	4.39E-06	6.44E-06	1.59E-06	2.08E-11
2698	459400	3772860	1.02E-10	2.20E-06	6.38E-06	7.93E-07	1.04E-11
2699	459900	3772860	-1.09E-11	0	0	0	-1.25E-12
2700	460400	3772860	-6.55E-11	0	0	0	-7.48E-12
2701	460900	3772860	-9.82E-11	0	0	0	-1.12E-11
2702	461400	3772860	-1.64E-10	0	2.42E-05	0	-1.87E-11
2703	461900	3772860	-2.95E-10	0	0	0	-3.37E-11
2704	462400	3772860	-4.69E-10	0	0	0	-5.36E-11

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2705	462900	3772860	-6.22E-10	0	0	0	-7.11E-11
2706	463400	3772860	-7.53E-10	0	0	0	-8.60E-11
2707	463900	3772860	-9.82E-10	0	1.86E-05	0	-1.12E-10
2708	464400	3772860	-1.26E-09	0	0	0	-1.43E-10
2709	464900	3772860	-1.47E-09	0	0	0	-1.68E-10
2710	465400	3772860	-1.67E-09	0	0	0	-1.91E-10
2711	465900	3772860	-1.89E-09	0	5.31E-07	0	-2.16E-10
2712	466400	3772860	-2.05E-09	0	2.51E-06	0	-2.34E-10
2713	466900	3772860	-2.21E-09	0	0	0	-2.52E-10
2714	467400	3772860	-2.36E-09	0	0	0	-2.69E-10
2715	467900	3772860	-2.49E-09	0	1.78E-05	0	-2.84E-10
2716	468400	3772860	-2.60E-09	0	0	0	-2.97E-10
2717	468900	3772860	-2.59E-09	0	0	0	-2.95E-10
2718	469400	3772860	-2.53E-09	0	0	0	-2.89E-10
2719	469900	3772860	-2.47E-09	0	2.93E-05	0	-2.82E-10
2720	470400	3772860	-2.42E-09	0	1.74E-05	0	-2.77E-10
2721	470900	3772860	-2.39E-09	0	0	0	-2.73E-10
2722	471400	3772860	-2.34E-09	0	0	0	-2.67E-10
2723	471900	3772860	-2.23E-09	0	5.20E-07	0	-2.54E-10
2724	472400	3772860	-2.12E-09	0	0	0	-2.42E-10
2725	472900	3772860	-2.00E-09	0	7.81E-06	0	-2.28E-10
2726	473400	3772860	-1.90E-09	0	0	0	-2.17E-10
2727	473900	3772860	-1.81E-09	0	1.23E-05	0	-2.07E-10
2728	474400	3772860	-1.74E-09	0	0	0	-1.98E-10
2729	474900	3772860	-1.65E-09	0	0	0	-1.88E-10
2730	475400	3772860	-1.55E-09	0	0	0	-1.77E-10
2731	457900	3773360	3.69E-10	7.96E-06	2.34E-06	2.88E-06	3.77E-11
2732	458400	3773360	3.31E-10	7.14E-06	8.77E-07	2.58E-06	3.38E-11
2733	458900	3773360	3.06E-10	6.59E-06	0	2.38E-06	3.12E-11
2734	459400	3773360	2.42E-10	5.22E-06	8.10E-06	1.88E-06	2.47E-11
2735	459900	3773360	1.15E-10	2.47E-06	5.57E-06	8.92E-07	1.17E-11
2736	460400	3773360	-2.18E-11	0	0	0	-2.49E-12
2737	460900	3773360	-7.64E-11	0	0	0	-8.73E-12
2738	461400	3773360	-1.31E-10	0	1.06E-05	0	-1.50E-11
2739	461900	3773360	-2.40E-10	0	1.63E-05	0	-2.74E-11
2740	462400	3773360	-4.37E-10	0	0	0	-4.99E-11
2741	462900	3773360	-6.44E-10	0	0	0	-7.36E-11
2742	463400	3773360	-8.19E-10	0	0	0	-9.35E-11
2743	463900	3773360	-1.05E-09	0	1.72E-05	0	-1.20E-10
2744	464400	3773360	-1.38E-09	0	5.75E-06	0	-1.57E-10
2745	464900	3773360	-1.67E-09	0	0	0	-1.91E-10
2746	465400	3773360	-1.92E-09	0	0	0	-2.19E-10
2747	465900	3773360	-2.17E-09	0	0	0	-2.48E-10
2748	466400	3773360	-2.40E-09	0	9.68E-07	0	-2.74E-10
2749	466900	3773360	-2.59E-09	0	0	0	-2.95E-10
2750	467400	3773360	-2.77E-09	0	2.19E-06	0	-3.17E-10
2751	467900	3773360	-2.94E-09	0	1.55E-05	0	-3.35E-10
2752	468400	3773360	-3.02E-09	0	0	0	-3.45E-10
2753	468900	3773360	-3.02E-09	0	1.67E-06	0	-3.45E-10
2754	469400	3773360	-2.93E-09	0	8.38E-06	0	-3.34E-10
2755	469900	3773360	-2.85E-09	0	3.92E-05	0	-3.25E-10
2756	470400	3773360	-2.82E-09	0	0	0	-3.22E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2757	470900	3773360	-2.76E-09	0	0	0	-3.15E-10
2758	471400	3773360	-2.64E-09	0	0	0	-3.02E-10
2759	471900	3773360	-2.52E-09	0	0	0	-2.88E-10
2760	472400	3773360	-2.37E-09	0	0	0	-2.71E-10
2761	472900	3773360	-2.23E-09	0	0	0	-2.54E-10
2762	473400	3773360	-2.12E-09	0	1.63E-05	0	-2.42E-10
2763	473900	3773360	-2.01E-09	0	0	0	-2.29E-10
2764	474400	3773360	-1.90E-09	0	0	0	-2.17E-10
2765	474900	3773360	-1.78E-09	0	0	0	-2.03E-10
2766	475400	3773360	-1.67E-09	0	0	0	-1.91E-10
2767	457900	3773860	5.22E-10	1.13E-05	0	4.07E-06	5.32E-11
2768	458400	3773860	4.71E-10	1.02E-05	1.63E-06	3.67E-06	4.80E-11
2769	458900	3773860	4.08E-10	8.79E-06	1.11E-06	3.17E-06	4.15E-11
2770	459400	3773860	3.69E-10	7.96E-06	0	2.88E-06	3.77E-11
2771	459900	3773860	2.80E-10	6.04E-06	8.99E-06	2.18E-06	2.86E-11
2772	460400	3773860	1.15E-10	2.47E-06	0	8.92E-07	1.17E-11
2773	460900	3773860	-2.18E-11	0	0	0	-2.49E-12
2774	461400	3773860	-9.82E-11	0	0	0	-1.12E-11
2775	461900	3773860	-1.75E-10	0	2.07E-05	0	-1.99E-11
2776	462400	3773860	-3.71E-10	0	0	0	-4.24E-11
2777	462900	3773860	-6.33E-10	0	0	0	-7.23E-11
2778	463400	3773860	-8.62E-10	0	0	0	-9.85E-11
2779	463900	3773860	-1.12E-09	0	7.27E-06	0	-1.28E-10
2780	464400	3773860	-1.51E-09	0	1.71E-05	0	-1.72E-10
2781	464900	3773860	-1.89E-09	0	0	0	-2.16E-10
2782	465400	3773860	-2.23E-09	0	0	0	-2.54E-10
2783	465900	3773860	-2.54E-09	0	0	0	-2.90E-10
2784	466400	3773860	-2.84E-09	0	0	0	-3.24E-10
2785	466900	3773860	-3.07E-09	0	0	0	-3.50E-10
2786	467400	3773860	-3.32E-09	0	5.61E-06	0	-3.79E-10
2787	467900	3773860	-3.49E-09	0	5.56E-06	0	-3.99E-10
2788	468400	3773860	-3.58E-09	0	0	0	-4.09E-10
2789	468900	3773860	-3.55E-09	0	0	0	-4.05E-10
2790	469400	3773860	-3.42E-09	0	3.04E-05	0	-3.90E-10
2791	469900	3773860	-3.34E-09	0	2.29E-05	0	-3.82E-10
2792	470400	3773860	-3.30E-09	0	0	0	-3.77E-10
2793	470900	3773860	-3.18E-09	0	0	0	-3.63E-10
2794	471400	3773860	-3.02E-09	0	7.71E-06	0	-3.45E-10
2795	471900	3773860	-2.84E-09	0	0	0	-3.24E-10
2796	472400	3773860	-2.66E-09	0	9.84E-07	0	-3.04E-10
2797	472900	3773860	-2.51E-09	0	2.13E-05	0	-2.87E-10
2798	473400	3773860	-2.37E-09	0	0	0	-2.71E-10
2799	473900	3773860	-2.22E-09	0	0	0	-2.53E-10
2800	474400	3773860	-2.07E-09	0	0	0	-2.37E-10
2801	474900	3773860	-1.93E-09	0	0	0	-2.21E-10
2802	475400	3773860	-1.81E-09	0	0	0	-2.07E-10
2803	457900	3774360	7.01E-10	1.51E-05	0	5.45E-06	7.14E-11
2804	458400	3774360	6.50E-10	1.40E-05	0	5.06E-06	6.62E-11
2805	458900	3774360	5.86E-10	1.26E-05	1.11E-06	4.56E-06	5.97E-11
2806	459400	3774360	5.22E-10	1.13E-05	1.44E-06	4.07E-06	5.32E-11
2807	459900	3774360	4.59E-10	9.89E-06	0	3.57E-06	4.67E-11
2808	460400	3774360	3.31E-10	7.14E-06	8.69E-06	2.58E-06	3.38E-11

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2809	460900	3774360	1.27E-10	2.75E-06	0	9.92E-07	1.30E-11
2810	461400	3774360	-3.27E-11	0	0	0	-3.74E-12
2811	461900	3774360	-1.31E-10	0	4.23E-06	0	-1.50E-11
2812	462400	3774360	-2.84E-10	0	2.00E-05	0	-3.24E-11
2813	462900	3774360	-5.79E-10	0	0	0	-6.61E-11
2814	463400	3774360	-9.06E-10	0	0	0	-1.03E-10
2815	463900	3774360	-1.20E-09	0	0	0	-1.37E-10
2816	464400	3774360	-1.64E-09	0	2.24E-05	0	-1.87E-10
2817	464900	3774360	-2.15E-09	0	0	0	-2.46E-10
2818	465400	3774360	-2.59E-09	0	0	0	-2.95E-10
2819	465900	3774360	-3.01E-09	0	0	0	-3.44E-10
2820	466400	3774360	-3.38E-09	0	0	0	-3.86E-10
2821	466900	3774360	-3.69E-09	0	0	0	-4.21E-10
2822	467400	3774360	-4.00E-09	0	8.78E-06	0	-4.56E-10
2823	467900	3774360	-4.21E-09	0	0	0	-4.81E-10
2824	468400	3774360	-4.28E-09	0	0	0	-4.89E-10
2825	468900	3774360	-4.17E-09	0	5.00E-07	0	-4.76E-10
2826	469400	3774360	-4.04E-09	0	5.11E-05	0	-4.61E-10
2827	469900	3774360	-3.97E-09	0	0	0	-4.54E-10
2828	470400	3774360	-3.86E-09	0	0	0	-4.41E-10
2829	470900	3774360	-3.68E-09	0	0	0	-4.20E-10
2830	471400	3774360	-3.45E-09	0	0	0	-3.94E-10
2831	471900	3774360	-3.23E-09	0	4.41E-06	0	-3.69E-10
2832	472400	3774360	-3.02E-09	0	2.72E-05	0	-3.45E-10
2833	472900	3774360	-2.84E-09	0	0	0	-3.24E-10
2834	473400	3774360	-2.64E-09	0	0	0	-3.02E-10
2835	473900	3774360	-2.43E-09	0	0	0	-2.78E-10
2836	474400	3774360	-2.27E-09	0	7.72E-08	0	-2.59E-10
2837	474900	3774360	-2.12E-09	0	0	0	-2.42E-10
2838	475400	3774360	-1.96E-09	0	3.62E-07	0	-2.24E-10
2839	457900	3774860	9.17E-10	1.98E-05	0	7.14E-06	9.35E-11
2840	458400	3774860	8.79E-10	1.90E-05	0	6.84E-06	8.96E-11
2841	458900	3774860	8.41E-10	1.81E-05	0	6.54E-06	8.57E-11
2842	459400	3774860	7.52E-10	1.62E-05	9.47E-07	5.85E-06	7.66E-11
2843	459900	3774860	6.62E-10	1.43E-05	1.92E-06	5.16E-06	6.75E-11
2844	460400	3774860	5.73E-10	1.24E-05	0	4.46E-06	5.84E-11
2845	460900	3774860	3.95E-10	8.51E-06	7.67E-06	3.07E-06	4.03E-11
2846	461400	3774860	1.40E-10	3.02E-06	0	1.09E-06	1.43E-11
2847	461900	3774860	-5.46E-11	0	0	0	-6.23E-12
2848	462400	3774860	-1.86E-10	0	1.32E-05	0	-2.12E-11
2849	462900	3774860	-4.80E-10	0	2.37E-06	0	-5.49E-11
2850	463400	3774860	-8.95E-10	0	0	0	-1.02E-10
2851	463900	3774860	-1.30E-09	0	0	0	-1.48E-10
2852	464400	3774860	-1.79E-09	0	1.84E-05	0	-2.04E-10
2853	464900	3774860	-2.47E-09	0	0	0	-2.82E-10
2854	465400	3774860	-3.06E-09	0	0	0	-3.49E-10
2855	465900	3774860	-3.61E-09	0	0	0	-4.13E-10
2856	466400	3774860	-4.09E-09	0	0	0	-4.68E-10
2857	466900	3774860	-4.52E-09	0	0	0	-5.16E-10
2858	467400	3774860	-4.90E-09	0	1.09E-05	0	-5.60E-10
2859	467900	3774860	-5.15E-09	0	0	0	-5.88E-10
2860	468400	3774860	-5.19E-09	0	0	0	-5.92E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2861	468900	3774860	-4.98E-09	0	3.29E-05	0	-5.69E-10
2862	469400	3774860	-4.86E-09	0	3.11E-05	0	-5.55E-10
2863	469900	3774860	-4.75E-09	0	0	0	-5.42E-10
2864	470400	3774860	-4.56E-09	0	0	0	-5.21E-10
2865	470900	3774860	-4.27E-09	0	0	0	-4.87E-10
2866	471400	3774860	-3.97E-09	0	8.97E-06	0	-4.54E-10
2867	471900	3774860	-3.70E-09	0	2.96E-05	0	-4.23E-10
2868	472400	3774860	-3.45E-09	0	0	0	-3.94E-10
2869	472900	3774860	-3.19E-09	0	0	0	-3.64E-10
2870	473400	3774860	-2.93E-09	0	0	0	-3.34E-10
2871	473900	3774860	-2.71E-09	0	3.49E-07	0	-3.09E-10
2872	474400	3774860	-2.49E-09	0	0	0	-2.84E-10
2873	474900	3774860	-2.31E-09	0	0	0	-2.64E-10
2874	475400	3774860	-2.15E-09	0	0	0	-2.46E-10
2875	457900	3775360	1.12E-09	2.42E-05	9.42E-06	8.73E-06	1.14E-10
2876	458400	3775360	1.15E-09	2.47E-05	1.16E-06	8.92E-06	1.17E-10
2877	458900	3775360	1.12E-09	2.42E-05	0	8.73E-06	1.14E-10
2878	459400	3775360	1.06E-09	2.28E-05	0	8.23E-06	1.08E-10
2879	459900	3775360	9.68E-10	2.09E-05	5.94E-07	7.54E-06	9.87E-11
2880	460400	3775360	8.54E-10	1.84E-05	2.60E-06	6.64E-06	8.70E-11
2881	460900	3775360	7.39E-10	1.59E-05	2.45E-06	5.75E-06	7.53E-11
2882	461400	3775360	4.84E-10	1.04E-05	4.64E-06	3.77E-06	4.93E-11
2883	461900	3775360	1.53E-10	3.30E-06	0	1.19E-06	1.56E-11
2884	462400	3775360	-8.73E-11	0	0	0	-9.97E-12
2885	462900	3775360	-3.38E-10	0	1.36E-05	0	-3.86E-11
2886	463400	3775360	-8.08E-10	0	0	0	-9.23E-11
2887	463900	3775360	-1.36E-09	0	0	0	-1.56E-10
2888	464400	3775360	-1.95E-09	0	1.42E-05	0	-2.23E-10
2889	464900	3775360	-2.81E-09	0	7.35E-06	0	-3.20E-10
2890	465400	3775360	-3.62E-09	0	0	0	-4.14E-10
2891	465900	3775360	-4.39E-09	0	0	0	-5.01E-10
2892	466400	3775360	-5.04E-09	0	0	0	-5.76E-10
2893	466900	3775360	-5.61E-09	0	0	0	-6.41E-10
2894	467400	3775360	-6.12E-09	0	1.06E-05	0	-6.99E-10
2895	467900	3775360	-6.40E-09	0	0	0	-7.31E-10
2896	468400	3775360	-6.31E-09	0	4.98E-07	0	-7.21E-10
2897	468900	3775360	-6.06E-09	0	6.48E-05	0	-6.92E-10
2898	469400	3775360	-5.94E-09	0	0	0	-6.78E-10
2899	469900	3775360	-5.71E-09	0	0	0	-6.52E-10
2900	470400	3775360	-5.37E-09	0	5.42E-06	0	-6.13E-10
2901	470900	3775360	-4.97E-09	0	0	0	-5.67E-10
2902	471400	3775360	-4.58E-09	0	2.44E-05	0	-5.24E-10
2903	471900	3775360	-4.25E-09	0	0	0	-4.85E-10
2904	472400	3775360	-3.91E-09	0	0	0	-4.46E-10
2905	472900	3775360	-3.57E-09	0	0	0	-4.08E-10
2906	473400	3775360	-3.26E-09	0	0	0	-3.73E-10
2907	473900	3775360	-2.99E-09	0	0	0	-3.42E-10
2908	474400	3775360	-2.75E-09	0	0	0	-3.14E-10
2909	474900	3775360	-2.54E-09	0	0	0	-2.90E-10
2910	475400	3775360	-2.36E-09	0	0	0	-2.69E-10
2911	457900	3775860	1.33E-09	2.86E-05	0	1.03E-05	1.35E-10
2912	458400	3775860	1.41E-09	3.05E-05	0	1.10E-05	1.44E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2913	458900	3775860	1.47E-09	3.16E-05	4.49E-06	1.14E-05	1.49E-10
2914	459400	3775860	1.45E-09	3.13E-05	0	1.13E-05	1.48E-10
2915	459900	3775860	1.40E-09	3.02E-05	0	1.09E-05	1.43E-10
2916	460400	3775860	1.27E-09	2.75E-05	0	9.92E-06	1.30E-10
2917	460900	3775860	1.13E-09	2.44E-05	4.69E-06	8.82E-06	1.16E-10
2918	461400	3775860	9.43E-10	2.03E-05	7.12E-06	7.34E-06	9.61E-11
2919	461900	3775860	5.86E-10	1.26E-05	3.59E-06	4.56E-06	5.97E-11
2920	462400	3775860	1.53E-10	3.30E-06	0	1.19E-06	1.56E-11
2921	462900	3775860	-1.64E-10	0	1.70E-06	0	-1.87E-11
2922	463400	3775860	-6.33E-10	0	9.54E-06	0	-7.23E-11
2923	463900	3775860	-1.36E-09	0	0	0	-1.56E-10
2924	464400	3775860	-2.12E-09	0	5.49E-06	0	-2.42E-10
2925	464900	3775860	-3.17E-09	0	2.98E-05	0	-3.62E-10
2926	465400	3775860	-4.36E-09	0	0	0	-4.97E-10
2927	465900	3775860	-5.41E-09	0	0	0	-6.18E-10
2928	466400	3775860	-6.33E-09	0	0	0	-7.23E-10
2929	466900	3775860	-7.14E-09	0	4.14E-06	0	-8.15E-10
2930	467400	3775860	-7.79E-09	0	1.65E-06	0	-8.90E-10
2931	467900	3775860	-7.99E-09	0	0	0	-9.13E-10
2932	468400	3775860	-7.84E-09	0	2.36E-05	0	-8.95E-10
2933	468900	3775860	-7.52E-09	0	4.43E-05	0	-8.59E-10
2934	469400	3775860	-7.34E-09	0	0	0	-8.38E-10
2935	469900	3775860	-6.91E-09	0	0	0	-7.89E-10
2936	470400	3775860	-6.37E-09	0	0	0	-7.28E-10
2937	470900	3775860	-5.84E-09	0	1.79E-05	0	-6.67E-10
2938	471400	3775860	-5.36E-09	0	0	0	-6.12E-10
2939	471900	3775860	-4.88E-09	0	0	0	-5.57E-10
2940	472400	3775860	-4.42E-09	0	0	0	-5.05E-10
2941	472900	3775860	-4.00E-09	0	0	0	-4.56E-10
2942	473400	3775860	-3.65E-09	0	3.64E-07	0	-4.16E-10
2943	473900	3775860	-3.32E-09	0	0	0	-3.79E-10
2944	474400	3775860	-3.06E-09	0	0	0	-3.49E-10
2945	474900	3775860	-2.82E-09	0	0	0	-3.22E-10
2946	475400	3775860	-2.60E-09	0	0	0	-2.97E-10
2947	457900	3776360	1.54E-09	3.32E-05	0	1.20E-05	1.57E-10
2948	458400	3776360	1.67E-09	3.60E-05	0	1.30E-05	1.70E-10
2949	458900	3776360	1.80E-09	3.87E-05	0	1.40E-05	1.83E-10
2950	459400	3776360	1.87E-09	4.04E-05	7.66E-06	1.46E-05	1.91E-10
2951	459900	3776360	1.91E-09	4.12E-05	5.56E-07	1.49E-05	1.95E-10
2952	460400	3776360	1.86E-09	4.01E-05	0	1.45E-05	1.90E-10
2953	460900	3776360	1.72E-09	3.71E-05	0	1.34E-05	1.75E-10
2954	461400	3776360	1.53E-09	3.30E-05	4.90E-06	1.19E-05	1.56E-10
2955	461900	3776360	1.24E-09	2.66E-05	9.94E-06	9.62E-06	1.26E-10
2956	462400	3776360	7.13E-10	1.54E-05	4.51E-06	5.55E-06	7.27E-11
2957	462900	3776360	1.40E-10	3.02E-06	0	1.09E-06	1.43E-11
2958	463400	3776360	-3.60E-10	0	1.84E-06	0	-4.11E-11
2959	463900	3776360	-1.20E-09	0	0	0	-1.37E-10
2960	464400	3776360	-2.27E-09	0	0	0	-2.59E-10
2961	464900	3776360	-3.58E-09	0	1.61E-05	0	-4.09E-10
2962	465400	3776360	-5.28E-09	0	0	0	-6.03E-10
2963	465900	3776360	-6.80E-09	0	0	0	-7.77E-10
2964	466400	3776360	-8.13E-09	0	0	0	-9.29E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
2965	466900	3776360	-9.28E-09	0	7.94E-06	0	-1.06E-09
2966	467400	3776360	-1.00E-08	0	0	0	-1.15E-09
2967	467900	3776360	-1.02E-08	0	0	0	-1.17E-09
2968	468400	3776360	-9.87E-09	0	7.64E-05	0	-1.13E-09
2969	468900	3776360	-9.62E-09	0	0	0	-1.10E-09
2970	469400	3776360	-9.10E-09	0	0	0	-1.04E-09
2971	469900	3776360	-8.38E-09	0	0	0	-9.57E-10
2972	470400	3776360	-7.63E-09	0	1.01E-05	0	-8.71E-10
2973	470900	3776360	-6.94E-09	0	0	0	-7.93E-10
2974	471400	3776360	-6.24E-09	0	0	0	-7.13E-10
2975	471900	3776360	-5.58E-09	0	0	0	-6.37E-10
2976	472400	3776360	-5.00E-09	0	0	0	-5.71E-10
2977	472900	3776360	-4.51E-09	0	0	0	-5.15E-10
2978	473400	3776360	-4.08E-09	0	0	0	-4.66E-10
2979	473900	3776360	-3.72E-09	0	0	0	-4.25E-10
2980	474400	3776360	-3.39E-09	0	0	0	-3.88E-10
2981	474900	3776360	-3.12E-09	0	0	0	-3.57E-10
2982	475400	3776360	-2.86E-09	0	0	0	-3.27E-10
2983	457900	3776860	1.80E-09	3.87E-05	2.82E-05	1.40E-05	1.83E-10
2984	458400	3776860	1.95E-09	4.20E-05	2.46E-05	1.52E-05	1.99E-10
2985	458900	3776860	2.13E-09	4.59E-05	0	1.66E-05	2.17E-10
2986	459400	3776860	2.31E-09	4.97E-05	0	1.79E-05	2.35E-10
2987	459900	3776860	2.47E-09	5.33E-05	0	1.92E-05	2.52E-10
2988	460400	3776860	2.57E-09	5.55E-05	7.05E-06	2.00E-05	2.62E-10
2989	460900	3776860	2.55E-09	5.49E-05	0	1.98E-05	2.60E-10
2990	461400	3776860	2.38E-09	5.14E-05	2.31E-06	1.85E-05	2.43E-10
2991	461900	3776860	2.10E-09	4.53E-05	5.54E-06	1.64E-05	2.14E-10
2992	462400	3776860	1.67E-09	3.60E-05	1.18E-05	1.30E-05	1.70E-10
2993	462900	3776860	9.05E-10	1.95E-05	1.82E-06	7.04E-06	9.22E-11
2994	463400	3776860	5.10E-11	1.10E-06	0	3.97E-07	5.19E-12
2995	463900	3776860	-8.95E-10	0	4.84E-06	0	-1.02E-10
2996	464400	3776860	-2.27E-09	0	0	0	-2.59E-10
2997	464900	3776860	-4.02E-09	0	3.45E-05	0	-4.59E-10
2998	465400	3776860	-6.41E-09	0	0	0	-7.32E-10
2999	465900	3776860	-8.74E-09	0	0	0	-9.99E-10
3000	466400	3776860	-1.08E-08	0	0	0	-1.23E-09
3001	466900	3776860	-1.24E-08	0	3.90E-06	0	-1.41E-09
3002	467400	3776860	-1.34E-08	0	0	0	-1.53E-09
3003	467900	3776860	-1.35E-08	0	1.27E-05	0	-1.54E-09
3004	468400	3776860	-1.29E-08	0	6.71E-05	0	-1.47E-09
3005	468900	3776860	-1.24E-08	0	0	0	-1.42E-09
3006	469400	3776860	-1.14E-08	0	0	0	-1.30E-09
3007	469900	3776860	-1.03E-08	0	5.51E-06	0	-1.18E-09
3008	470400	3776860	-9.24E-09	0	3.01E-07	0	-1.05E-09
3009	470900	3776860	-8.21E-09	0	0	0	-9.38E-10
3010	471400	3776860	-7.23E-09	0	0	0	-8.25E-10
3011	471900	3776860	-6.39E-09	0	0	0	-7.29E-10
3012	472400	3776860	-5.69E-09	0	0	0	-6.50E-10
3013	472900	3776860	-5.10E-09	0	0	0	-5.82E-10
3014	473400	3776860	-4.61E-09	0	0	0	-5.26E-10
3015	473900	3776860	-4.17E-09	0	0	0	-4.76E-10
3016	474400	3776860	-3.80E-09	0	0	0	-4.34E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3017	474900	3776860	-3.45E-09	0	0	0	-3.94E-10
3018	475400	3776860	-3.15E-09	0	0	0	-3.60E-10
3019	457900	3777360	2.05E-09	4.42E-05	0	1.60E-05	2.09E-10
3020	458400	3777360	2.26E-09	4.86E-05	0	1.76E-05	2.30E-10
3021	458900	3777360	2.48E-09	5.36E-05	2.92E-05	1.93E-05	2.53E-10
3022	459400	3777360	2.74E-09	5.91E-05	1.75E-05	2.13E-05	2.79E-10
3023	459900	3777360	3.02E-09	6.51E-05	0	2.35E-05	3.08E-10
3024	460400	3777360	3.30E-09	7.11E-05	0	2.57E-05	3.36E-10
3025	460900	3777360	3.52E-09	7.58E-05	5.67E-07	2.74E-05	3.58E-10
3026	461400	3777360	3.54E-09	7.64E-05	3.55E-07	2.76E-05	3.61E-10
3027	461900	3777360	3.36E-09	7.25E-05	3.30E-06	2.62E-05	3.43E-10
3028	462400	3777360	2.99E-09	6.45E-05	7.03E-06	2.33E-05	3.05E-10
3029	462900	3777360	2.31E-09	4.97E-05	1.03E-05	1.79E-05	2.35E-10
3030	463400	3777360	1.11E-09	2.39E-05	2.27E-06	8.63E-06	1.13E-10
3031	463900	3777360	-2.07E-10	0	0	0	-2.37E-11
3032	464400	3777360	-1.93E-09	0	0	0	-2.21E-10
3033	464900	3777360	-4.43E-09	0	0	0	-5.06E-10
3034	465400	3777360	-7.81E-09	0	1.85E-05	0	-8.91E-10
3035	465900	3777360	-1.15E-08	0	0	0	-1.32E-09
3036	466400	3777360	-1.47E-08	0	0	0	-1.68E-09
3037	466900	3777360	-1.71E-08	0	0	0	-1.95E-09
3038	467400	3777360	-1.85E-08	0	0	0	-2.11E-09
3039	467900	3777360	-1.82E-08	0	8.67E-05	0	-2.08E-09
3040	468400	3777360	-1.75E-08	0	0	0	-2.00E-09
3041	468900	3777360	-1.62E-08	0	0	0	-1.85E-09
3042	469400	3777360	-1.45E-08	0	0	0	-1.65E-09
3043	469900	3777360	-1.28E-08	0	1.37E-05	0	-1.46E-09
3044	470400	3777360	-1.12E-08	0	0	0	-1.28E-09
3045	470900	3777360	-9.68E-09	0	0	0	-1.11E-09
3046	471400	3777360	-8.41E-09	0	2.88E-07	0	-9.60E-10
3047	471900	3777360	-7.37E-09	0	0	0	-8.42E-10
3048	472400	3777360	-6.51E-09	0	0	0	-7.43E-10
3049	472900	3777360	-5.81E-09	0	0	0	-6.63E-10
3050	473400	3777360	-5.21E-09	0	0	0	-5.95E-10
3051	473900	3777360	-4.68E-09	0	0	0	-5.35E-10
3052	474400	3777360	-4.20E-09	0	0	0	-4.80E-10
3053	474900	3777360	-3.80E-09	0	0	0	-4.34E-10
3054	475400	3777360	-3.44E-09	0	0	0	-3.93E-10
3055	457900	3777860	2.32E-09	5.00E-05	3.85E-05	1.80E-05	2.36E-10
3056	458400	3777860	2.78E-09	5.99E-05	4.15E-05	2.16E-05	2.83E-10
3057	458900	3777860	4.76E-09	0.00010272	0	3.71E-05	4.86E-10
3058	459400	3777860	3.38E-09	7.28E-05	4.34E-06	2.63E-05	3.44E-10
3059	459900	3777860	5.91E-09	0.00012744	0	4.60E-05	6.02E-10
3060	460400	3777860	5.33E-09	0.0001148	0	4.14E-05	5.43E-10
3061	460900	3777860	4.19E-09	9.04E-05	0	3.26E-05	4.27E-10
3062	461400	3777860	5.22E-09	0.00011261	0	4.07E-05	5.32E-10
3063	461900	3777860	5.26E-09	0.00011343	3.56E-06	4.09E-05	5.36E-10
3064	462400	3777860	5.06E-09	0.00010904	7.40E-06	3.94E-05	5.15E-10
3065	462900	3777860	4.52E-09	9.75E-05	8.49E-06	3.52E-05	4.61E-10
3066	463400	3777860	3.34E-09	7.20E-05	4.99E-06	2.60E-05	3.40E-10
3067	463900	3777860	1.33E-09	2.86E-05	0	1.03E-05	1.35E-10
3068	464400	3777860	-1.04E-09	0	4.01E-06	0	-1.18E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3069	464900	3777860	-4.53E-09	0	0	0	-5.17E-10
3070	465400	3777860	-9.52E-09	0	0	0	-1.09E-09
3071	465900	3777860	-1.57E-08	0	0	0	-1.79E-09
3072	466400	3777860	-2.08E-08	0	0	0	-2.38E-09
3073	466900	3777860	-2.49E-08	0	0	0	-2.84E-09
3074	467400	3777860	-2.64E-08	0	0	0	-3.02E-09
3075	467900	3777860	-2.59E-08	0	0.00010934	0	-2.96E-09
3076	468400	3777860	-2.42E-08	0	0	0	-2.76E-09
3077	468900	3777860	-2.15E-08	0	0	0	-2.45E-09
3078	469400	3777860	-1.86E-08	0	3.62E-05	0	-2.12E-09
3079	469900	3777860	-1.59E-08	0	0	0	-1.82E-09
3080	470400	3777860	-1.35E-08	0	0	0	-1.54E-09
3081	470900	3777860	-1.15E-08	0	0	0	-1.31E-09
3082	471400	3777860	-9.85E-09	0	0	0	-1.12E-09
3083	471900	3777860	-8.55E-09	0	0	0	-9.76E-10
3084	472400	3777860	-7.48E-09	0	0	0	-8.54E-10
3085	472900	3777860	-6.60E-09	0	0	0	-7.54E-10
3086	473400	3777860	-5.86E-09	0	0	0	-6.69E-10
3087	473900	3777860	-5.20E-09	0	0	0	-5.93E-10
3088	474400	3777860	-4.62E-09	0	0	0	-5.27E-10
3089	474900	3777860	-4.12E-09	0	0	0	-4.70E-10
3090	475400	3777860	-3.68E-09	0	1.91E-06	0	-4.20E-10
3091	457900	3778360	5.08E-09	0.00010959	0	3.96E-05	5.18E-10
3092	458400	3778360	6.84E-09	0.00014749	0	5.32E-05	6.97E-10
3093	458900	3778360	7.84E-09	0.00016891	0	6.10E-05	7.99E-10
3094	459400	3778360	8.85E-09	0.00019088	0	6.89E-05	9.02E-10
3095	459900	3778360	1.01E-08	0.00021862	0	7.89E-05	1.03E-09
3096	460400	3778360	4.45E-09	9.59E-05	0	3.46E-05	4.53E-10
3097	460900	3778360	5.13E-09	0.00011068	0	4.00E-05	5.23E-10
3098	461400	3778360	1.44E-08	0.00031008	0	0.00011194	1.47E-09
3099	461900	3778360	1.19E-08	0.00025625	0	9.25E-05	1.21E-09
3100	462400	3778360	1.01E-08	0.00021752	0	7.85E-05	1.03E-09
3101	462900	3778360	7.96E-09	0.00017166	7.27E-06	6.20E-05	8.12E-10
3102	463400	3778360	7.16E-09	0.00015435	1.02E-05	5.57E-05	7.30E-10
3103	463900	3778360	5.03E-09	0.00010849	1.23E-05	3.92E-05	5.13E-10
3104	464400	3778360	1.34E-09	2.88E-05	0	1.04E-05	1.36E-10
3105	464900	3778360	-3.62E-09	0	0	0	-4.14E-10
3106	465400	3778360	-1.14E-08	0	0	0	-1.30E-09
3107	465900	3778360	-2.20E-08	0	0	0	-2.51E-09
3108	466400	3778360	-3.16E-08	0	0	0	-3.61E-09
3109	466900	3778360	-3.82E-08	0	0	0	-4.36E-09
3110	467400	3778360	-4.09E-08	0	6.80E-05	0	-4.67E-09
3111	467900	3778360	-3.86E-08	0	0	0	-4.41E-09
3112	468400	3778360	-3.42E-08	0	0	0	-3.91E-09
3113	468900	3778360	-2.90E-08	0	6.37E-05	0	-3.31E-09
3114	469400	3778360	-2.41E-08	0	0	0	-2.75E-09
3115	469900	3778360	-1.98E-08	0	0	0	-2.26E-09
3116	470400	3778360	-1.63E-08	0	0	0	-1.87E-09
3117	470900	3778360	-1.38E-08	0	0	0	-1.58E-09
3118	471400	3778360	-1.16E-08	0	0	0	-1.33E-09
3119	471900	3778360	-9.85E-09	0	0	0	-1.12E-09
3120	472400	3778360	-8.51E-09	0	0	0	-9.72E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3121	472900	3778360	-7.40E-09	0	0	0	-8.45E-10
3122	473400	3778360	-6.47E-09	0	0	0	-7.39E-10
3123	473900	3778360	-5.65E-09	0	3.30E-07	0	-6.46E-10
3124	474400	3778360	-4.98E-09	0	0	0	-5.69E-10
3125	474900	3778360	-4.40E-09	0	0	0	-5.02E-10
3126	475400	3778360	-3.90E-09	0	0	0	-4.45E-10
3127	457900	3778860	5.13E-09	0.00011068	0	4.00E-05	5.23E-10
3128	458400	3778860	4.68E-09	0.0001008	0	3.64E-05	4.77E-10
3129	458900	3778860	4.51E-09	9.72E-05	0	3.51E-05	4.60E-10
3130	459400	3778860	4.85E-09	0.00010464	0	3.78E-05	4.95E-10
3131	459900	3778860	6.20E-09	0.00013375	0	4.83E-05	6.32E-10
3132	460400	3778860	5.17E-09	0.00011151	0	4.03E-05	5.27E-10
3133	460900	3778860	8.56E-09	0.00018456	0	6.66E-05	8.73E-10
3134	461400	3778860	1.17E-08	0.0002524	0	9.11E-05	1.19E-09
3135	461900	3778860	1.99E-08	0.00042983	0	0.00015517	2.03E-09
3136	462400	3778860	2.29E-08	0.00049327	0	0.00017808	2.33E-09
3137	462900	3778860	1.80E-08	0.00038835	0	0.0001402	1.84E-09
3138	463400	3778860	1.37E-08	0.00029525	5.98E-06	0.00010659	1.40E-09
3139	463900	3778860	1.23E-08	0.00026504	1.76E-05	9.57E-05	1.25E-09
3140	464400	3778860	8.15E-09	0.00017578	1.42E-05	6.35E-05	8.31E-10
3141	464900	3778860	-3.27E-10	0	0	0	-3.74E-11
3142	465400	3778860	-1.26E-08	0	6.33E-05	0	-1.44E-09
3143	465900	3778860	-3.20E-08	0	0	0	-3.65E-09
3144	466400	3778860	-5.15E-08	0	0	0	-5.88E-09
3145	466900	3778860	-6.61E-08	0	0	0	-7.55E-09
3146	467400	3778860	-6.73E-08	0	0.00020434	0	-7.69E-09
3147	467900	3778860	-6.02E-08	0	0	0	-6.87E-09
3148	468400	3778860	-4.97E-08	0	5.38E-05	0	-5.68E-09
3149	468900	3778860	-3.97E-08	0	0	0	-4.54E-09
3150	469400	3778860	-3.13E-08	0	0	0	-3.57E-09
3151	469900	3778860	-2.49E-08	0	0	0	-2.84E-09
3152	470400	3778860	-2.01E-08	0	0	0	-2.29E-09
3153	470900	3778860	-1.65E-08	0	0	0	-1.88E-09
3154	471400	3778860	-1.38E-08	0	0	0	-1.58E-09
3155	471900	3778860	-1.14E-08	0	0	0	-1.30E-09
3156	472400	3778860	-9.60E-09	0	0	0	-1.10E-09
3157	472900	3778860	-8.20E-09	0	0	0	-9.36E-10
3158	473400	3778860	-7.04E-09	0	0	0	-8.04E-10
3159	473900	3778860	-6.08E-09	0	0	0	-6.94E-10
3160	474400	3778860	-5.29E-09	0	0	0	-6.05E-10
3161	474900	3778860	-4.65E-09	0	0	0	-5.31E-10
3162	475400	3778860	-4.08E-09	0	0	0	-4.66E-10
3163	457900	3779360	2.51E-09	5.41E-05	0	1.95E-05	2.56E-10
3164	458400	3779360	2.76E-09	5.96E-05	0	2.15E-05	2.82E-10
3165	458900	3779360	3.44E-09	7.42E-05	1.48E-05	2.68E-05	3.51E-10
3166	459400	3779360	4.37E-09	9.42E-05	0	3.40E-05	4.45E-10
3167	459900	3779360	5.17E-09	0.00011151	0	4.03E-05	5.27E-10
3168	460400	3779360	5.86E-09	0.00012634	4.29E-05	4.56E-05	5.97E-10
3169	460900	3779360	7.16E-09	0.00015435	0	5.57E-05	7.30E-10
3170	461400	3779360	8.84E-09	0.00019061	7.97E-06	6.88E-05	9.01E-10
3171	461900	3779360	1.21E-08	0.00025982	0	9.38E-05	1.23E-09
3172	462400	3779360	1.81E-08	0.00039028	0	0.00014089	1.85E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3173	462900	3779360	3.30E-08	0.00071189	0	0.000257	3.37E-09
3174	463400	3779360	3.02E-08	0.00065119	0	0.00023509	3.08E-09
3175	463900	3779360	2.49E-08	0.00053721	1.58E-05	0.00019394	2.54E-09
3176	464400	3779360	2.35E-08	0.0005059	9.21E-05	0.00018264	2.39E-09
3177	468900	3779360	-5.45E-08	0	0	0	-6.22E-09
3178	469400	3779360	-4.10E-08	0	0	0	-4.68E-09
3179	469900	3779360	-3.15E-08	0	0	0	-3.60E-09
3180	470400	3779360	-2.48E-08	0	0	0	-2.84E-09
3181	470900	3779360	-2.00E-08	0	0	0	-2.28E-09
3182	471400	3779360	-2.77E-08	0	0	0	-3.16E-09
3183	471900	3779360	-3.01E-08	0	0	0	-3.44E-09
3184	472400	3779360	-1.06E-08	0	0	0	-1.21E-09
3185	472900	3779360	-8.86E-09	0	0	0	-1.01E-09
3186	473400	3779360	-7.53E-09	0	0	0	-8.60E-10
3187	473900	3779360	-6.45E-09	0	0	0	-7.37E-10
3188	474400	3779360	-5.56E-09	0	0	0	-6.35E-10
3189	474900	3779360	-4.82E-09	0	0	0	-5.51E-10
3190	475400	3779360	-4.21E-09	0	0	0	-4.81E-10
3191	457900	3779860	5.35E-10	1.15E-05	0	4.16E-06	5.45E-11
3192	458400	3779860	2.17E-10	4.67E-06	0	1.69E-06	2.21E-11
3193	458900	3779860	-6.93E-17	0	0	0	-1.84E-18
3194	459400	3779860	7.64E-11	1.65E-06	2.69E-05	5.95E-07	7.79E-12
3195	459900	3779860	9.30E-10	2.00E-05	3.63E-05	7.24E-06	9.48E-11
3196	460400	3779860	2.76E-09	5.96E-05	9.59E-05	2.15E-05	2.82E-10
3197	460900	3779860	5.39E-09	0.00011618	0.00017227	4.19E-05	5.49E-10
3198	461400	3779860	8.31E-09	0.00017907	0	6.46E-05	8.47E-10
3199	461900	3779860	1.15E-08	0.00024883	2.82E-05	8.98E-05	1.18E-09
3200	462400	3779860	1.67E-08	0.00036034	0	0.00013009	1.70E-09
3201	462900	3779860	2.57E-08	0.00055369	0	0.00019989	2.62E-09
3202	463400	3779860	4.98E-08	0.0010744	0	0.00038788	5.08E-09
3203	463900	3779860	4.62E-08	0.00099588	0	0.00035952	4.71E-09
3204	464400	3779860	5.21E-08	0.001123	5.29E-05	0.00040543	5.31E-09
3205	468900	3779860	-7.62E-08	0	0	0	-8.70E-09
3206	469400	3779860	-5.40E-08	0	0	0	-6.17E-09
3207	469900	3779860	-3.97E-08	0	0	0	-4.53E-09
3208	470400	3779860	-4.86E-08	0	0	0	-5.55E-09
3209	470900	3779860	-2.43E-08	0	0	0	-2.77E-09
3210	471400	3779860	-1.80E-08	0	0	0	-2.06E-09
3211	471900	3779860	-3.47E-08	0	0	0	-3.97E-09
3212	472400	3779860	-1.17E-08	0	0	0	-1.34E-09
3213	472900	3779860	-9.45E-09	0	0	0	-1.08E-09
3214	473400	3779860	-7.89E-09	0	0	0	-9.01E-10
3215	473900	3779860	-6.65E-09	0	0	0	-7.59E-10
3216	474400	3779860	-5.69E-09	0	0	0	-6.50E-10
3217	474900	3779860	-4.89E-09	0	3.01E-06	0	-5.59E-10
3218	475400	3779860	-4.24E-09	0	2.43E-06	0	-4.84E-10
3219	457900	3780360	1.62E-09	3.49E-05	4.46E-05	1.26E-05	1.65E-10
3220	458400	3780360	1.89E-09	4.06E-05	3.69E-05	1.47E-05	1.92E-10
3221	458900	3780360	2.03E-09	4.37E-05	4.03E-05	1.58E-05	2.06E-10
3222	459400	3780360	1.97E-09	4.26E-05	4.75E-05	1.54E-05	2.01E-10
3223	459900	3780360	1.71E-09	3.68E-05	2.01E-05	1.33E-05	1.74E-10
3224	460400	3780360	1.16E-09	2.50E-05	3.01E-05	9.02E-06	1.18E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3225	460900	3780360	5.48E-10	1.18E-05	0	4.26E-06	5.58E-11
3226	461400	3780360	5.86E-10	1.26E-05	0	4.56E-06	5.97E-11
3227	461900	3780360	2.59E-09	5.58E-05	6.15E-05	2.01E-05	2.64E-10
3228	462400	3780360	9.31E-09	0.00020077	7.36E-06	7.25E-05	9.49E-10
3229	462900	3780360	1.82E-08	0.0003922	4.27E-05	0.00014159	1.85E-09
3230	463400	3780360	4.40E-08	0.00094892	0	0.00034257	4.49E-09
3231	463900	3780360	8.47E-08	0.0018267	0	0.00065945	8.64E-09
3232	464400	3780360	9.78E-08	0.0021077	1.79E-05	0.00076089	9.96E-09
3233	468900	3780360	-1.05E-07	0	0	0	-1.20E-08
3234	469400	3780360	-6.86E-08	0	0	0	-7.83E-09
3235	469900	3780360	-4.86E-08	0	0	0	-5.55E-09
3236	470400	3780360	-5.05E-08	0	0	0	-5.76E-09
3237	470900	3780360	-2.52E-08	0	0	0	-2.87E-09
3238	471400	3780360	-1.92E-08	0	0	0	-2.19E-09
3239	471900	3780360	-1.48E-08	0	0	0	-1.69E-09
3240	472400	3780360	-1.18E-08	0	0	0	-1.34E-09
3241	472900	3780360	-9.51E-09	0	0	0	-1.09E-09
3242	473400	3780360	-7.82E-09	0	0	0	-8.93E-10
3243	473900	3780360	-6.53E-09	0	0	0	-7.46E-10
3244	474400	3780360	-5.53E-09	0	0	0	-6.32E-10
3245	474900	3780360	-4.73E-09	0	0	0	-5.40E-10
3246	475400	3780360	-4.06E-09	0	0	0	-4.64E-10
3247	457900	3780860	2.68E-10	5.77E-06	2.66E-05	2.08E-06	2.73E-11
3248	458400	3780860	6.88E-10	1.48E-05	2.87E-05	5.35E-06	7.01E-11
3249	458900	3780860	1.11E-09	2.39E-05	1.66E-05	8.63E-06	1.13E-10
3250	459400	3780860	1.58E-09	3.41E-05	4.00E-05	1.23E-05	1.61E-10
3251	459900	3780860	2.08E-09	4.48E-05	7.56E-05	1.62E-05	2.12E-10
3252	460400	3780860	2.66E-09	5.74E-05	0.00012758	2.07E-05	2.71E-10
3253	460900	3780860	3.26E-09	7.03E-05	0.00014665	2.54E-05	3.32E-10
3254	461400	3780860	3.99E-09	8.60E-05	0.00024065	3.10E-05	4.06E-10
3255	461900	3780860	4.38E-09	9.45E-05	0.00019647	3.41E-05	4.47E-10
3256	462400	3780860	4.54E-09	9.78E-05	0.000126	3.53E-05	4.62E-10
3257	462900	3780860	8.31E-09	0.00017907	5.21E-05	6.46E-05	8.47E-10
3258	463400	3780860	2.95E-08	0.00063581	0	0.00022953	3.01E-09
3259	463900	3780860	6.37E-08	0.001373	0	0.00049566	6.49E-09
3260	464400	3780860	1.59E-07	0.003435	0	0.0012401	1.62E-08
3261	468900	3780860	-1.22E-07	0	0	0	-1.39E-08
3262	469400	3780860	-7.29E-08	0	0	0	-8.33E-09
3263	469900	3780860	-4.73E-08	0	0	0	-5.40E-09
3264	470400	3780860	-3.25E-08	0	0	0	-3.71E-09
3265	470900	3780860	-2.34E-08	0	0	0	-2.67E-09
3266	471400	3780860	-1.74E-08	0	0	0	-1.99E-09
3267	471900	3780860	-1.34E-08	0	0	0	-1.53E-09
3268	472400	3780860	-1.05E-08	0	0	0	-1.20E-09
3269	472900	3780860	-8.43E-09	0	0	0	-9.62E-10
3270	473400	3780860	-6.87E-09	0	0	0	-7.84E-10
3271	473900	3780860	-5.72E-09	0	0	0	-6.53E-10
3272	474400	3780860	-4.82E-09	0	0	0	-5.51E-10
3273	474900	3780860	-4.10E-09	0	0	0	-4.69E-10
3274	475400	3780860	-3.53E-09	0	0	0	-4.03E-10
3275	457900	3781360	-4.13E-09	0	0.0001111	0	-4.71E-10
3276	458400	3781360	-4.70E-09	0	0.00012608	0	-5.37E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3277	458900	3781360	-5.49E-09	0	0.00011787	0	-6.27E-10
3278	459400	3781360	-6.57E-09	0	0.00011139	0	-7.51E-10
3279	459900	3781360	-8.15E-09	0	0.00011371	0	-9.31E-10
3280	460400	3781360	-1.03E-08	0	0.00012677	0	-1.18E-09
3281	460900	3781360	-1.34E-08	0	0.00015743	0	-1.53E-09
3282	461400	3781360	-1.80E-08	0	0.00021758	0	-2.06E-09
3283	461900	3781360	-2.52E-08	0	0.00031811	0	-2.88E-09
3284	462400	3781360	-3.70E-08	0	0.0003256	0	-4.23E-09
3285	462900	3781360	-5.43E-08	0	0.0002825	0	-6.21E-09
3286	463400	3781360	-6.13E-08	0	0	0	-7.00E-09
3287	463900	3781360	-8.46E-08	0	5.83E-05	0	-9.66E-09
3288	464400	3781360	-9.73E-08	0	0	0	-1.11E-08
3289	468900	3781360	-7.16E-08	0	0	0	-8.18E-09
3290	469400	3781360	-4.51E-08	0	0	0	-5.15E-09
3291	469900	3781360	-3.05E-08	0	0	0	-3.48E-09
3292	470400	3781360	-2.17E-08	0	0	0	-2.48E-09
3293	470900	3781360	-1.60E-08	0	0	0	-1.83E-09
3294	471400	3781360	-1.22E-08	0	2.71E-06	0	-1.40E-09
3295	471900	3781360	-9.60E-09	0	1.12E-05	0	-1.10E-09
3296	472400	3781360	-7.68E-09	0	6.65E-06	0	-8.78E-10
3297	472900	3781360	-6.27E-09	0	3.34E-06	0	-7.16E-10
3298	473400	3781360	-5.20E-09	0	9.06E-07	0	-5.93E-10
3299	473900	3781360	-4.38E-09	0	0	0	-5.00E-10
3300	474400	3781360	-3.73E-09	0	0	0	-4.26E-10
3301	474900	3781360	-3.21E-09	0	0	0	-3.67E-10
3302	475400	3781360	-2.78E-09	0	0	0	-3.18E-10
3303	457900	3781860	-4.49E-09	0	2.70E-05	0	-5.12E-10
3304	458400	3781860	-5.31E-09	0	0	0	-6.06E-10
3305	458900	3781860	-6.27E-09	0	0	0	-7.16E-10
3306	459400	3781860	-7.08E-09	0	1.77E-05	0	-8.09E-10
3307	459900	3781860	-8.22E-09	0	8.44E-05	0	-9.39E-10
3308	460400	3781860	-9.53E-09	0	0.00010515	0	-1.09E-09
3309	460900	3781860	-1.07E-08	0	0.00013949	0	-1.22E-09
3310	461400	3781860	-1.09E-08	0	0.00020417	0	-1.24E-09
3311	461900	3781860	-7.39E-09	0	0.0002327	0	-8.44E-10
3312	462400	3781860	3.38E-09	7.28E-05	0.00023994	2.63E-05	3.44E-10
3313	462900	3781860	-2.32E-08	0	9.13E-06	0	-2.65E-09
3314	463400	3781860	1.05E-08	0.00022576	9.53E-05	8.15E-05	1.07E-09
3315	463900	3781860	1.80E-07	0.0038742	0.00027109	0.0013986	1.83E-08
3316	464400	3781860	2.53E-07	0.0054491	0.00014207	0.0019672	2.58E-08
3317	468900	3781860	-4.47E-08	0	0	0	-5.11E-09
3318	469400	3781860	-2.90E-08	0	0	0	-3.32E-09
3319	469900	3781860	-1.99E-08	0	0	0	-2.28E-09
3320	470400	3781860	-1.43E-08	0	0	0	-1.64E-09
3321	470900	3781860	-1.07E-08	0	0	0	-1.22E-09
3322	471400	3781860	-8.25E-09	0	0	0	-9.43E-10
3323	471900	3781860	-6.56E-09	0	0	0	-7.49E-10
3324	472400	3781860	-5.33E-09	0	0	0	-6.08E-10
3325	472900	3781860	-4.41E-09	0	0	0	-5.04E-10
3326	473400	3781860	-3.70E-09	0	0	0	-4.23E-10
3327	473900	3781860	-3.15E-09	0	0	0	-3.60E-10
3328	474400	3781860	-7.46E-09	0	0	0	-8.52E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3329	474900	3781860	-2.36E-09	0	0	0	-2.69E-10
3330	475400	3781860	-8.42E-09	0	0	0	-9.61E-10
3331	457900	3782360	-2.71E-09	0	1.61E-05	0	-3.09E-10
3332	458400	3782360	-2.51E-09	0	1.53E-05	0	-2.87E-10
3333	458900	3782360	-1.50E-09	0	8.01E-05	0	-1.71E-10
3334	459400	3782360	1.55E-09	3.35E-05	9.05E-05	1.21E-05	1.58E-10
3335	459900	3782360	6.31E-09	0.00013595	7.74E-05	4.91E-05	6.43E-10
3336	460400	3782360	1.40E-08	0.00030074	8.86E-05	0.00010857	1.42E-09
3337	460900	3782360	2.54E-08	0.00054848	8.14E-05	0.000198	2.59E-09
3338	461400	3782360	4.20E-08	0.0009058	7.90E-05	0.000327	4.28E-09
3339	461900	3782360	6.85E-08	0.0014757	0.00024998	0.00053274	6.98E-09
3340	462400	3782360	1.11E-07	0.0023985	0.00022447	0.00086589	1.13E-08
3341	462900	3782360	1.16E-07	0.0025078	0.00010608	0.00090535	1.19E-08
3342	463400	3782360	1.97E-07	0.0042538	0.0003745	0.0015357	2.01E-08
3343	463900	3782360	2.22E-07	0.0047781	0.00080104	0.0017249	2.26E-08
3344	464400	3782360	1.74E-07	0.003755	0.00058842	0.0013556	1.78E-08
3345	468900	3782360	1.82E-08	0.0003933	0	0.00014198	1.86E-09
3346	469400	3782360	-2.41E-08	0	0	0	-2.75E-09
3347	469900	3782360	-1.77E-08	0	0	0	-2.02E-09
3348	470400	3782360	-1.32E-08	0	0	0	-1.50E-09
3349	470900	3782360	-9.97E-09	0	0	0	-1.14E-09
3350	471400	3782360	-7.70E-09	0	0	0	-8.79E-10
3351	471900	3782360	-6.04E-09	0	0	0	-6.89E-10
3352	472400	3782360	-4.80E-09	0	0	0	-5.49E-10
3353	472900	3782360	-3.89E-09	0	0	0	-4.44E-10
3354	473400	3782360	-3.19E-09	0	0	0	-3.64E-10
3355	473900	3782360	-4.63E-09	0	0	0	-5.29E-10
3356	474400	3782360	4.97E-09	0.00010711	0	3.87E-05	5.06E-10
3357	474900	3782360	3.45E-09	7.44E-05	0	2.69E-05	3.52E-10
3358	475400	3782360	3.35E-09	7.22E-05	0	2.61E-05	3.41E-10
3359	457900	3782860	4.89E-09	0.00010547	4.19E-05	3.81E-05	4.99E-10
3360	458400	3782860	7.47E-09	0.00016094	7.13E-05	5.81E-05	7.61E-10
3361	458900	3782860	1.02E-08	0.00022054	3.15E-05	7.96E-05	1.04E-09
3362	459400	3782860	1.63E-08	0.00035183	7.12E-05	0.00012701	1.66E-09
3363	459900	3782860	2.24E-08	0.00048201	6.74E-05	0.00017401	2.28E-09
3364	460400	3782860	3.15E-08	0.00067976	0.00011515	0.0002454	3.21E-09
3365	460900	3782860	4.53E-08	0.00097556	5.04E-05	0.00035218	4.61E-09
3366	461400	3782860	6.44E-08	0.0013875	0.00013056	0.00050091	6.56E-09
3367	461900	3782860	8.57E-08	0.0018476	0.0001458	0.00066699	8.73E-09
3368	462400	3782860	9.88E-08	0.0021302	0.0001438	0.00076902	1.01E-08
3369	462900	3782860	9.68E-08	0.0020862	0.00034761	0.00075315	9.86E-09
3370	463400	3782860	7.89E-08	0.0017012	0.00034663	0.00061414	8.04E-09
3371	463900	3782860	4.28E-08	0.00092337	0.00040832	0.00033335	4.37E-09
3372	464400	3782860	7.22E-08	0.0015559	0.00064721	0.00056169	7.36E-09
3373	468900	3782860	-1.05E-08	0	0	0	-1.19E-09
3374	469400	3782860	-1.16E-08	0	0	0	-1.32E-09
3375	469900	3782860	-1.35E-08	0	4.08E-05	0	-1.54E-09
3376	470400	3782860	-1.07E-08	0	3.87E-05	0	-1.23E-09
3377	470900	3782860	1.01E-08	0.00021862	0	7.89E-05	1.03E-09
3378	471400	3782860	4.09E-09	8.82E-05	0	3.18E-05	4.17E-10
3379	471900	3782860	1.77E-09	3.82E-05	0	1.38E-05	1.80E-10
3380	472400	3782860	4.41E-09	9.50E-05	0	3.43E-05	4.49E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3381	472900	3782860	3.91E-09	8.43E-05	0	3.04E-05	3.99E-10
3382	473400	3782860	3.19E-09	6.87E-05	3.31E-06	2.48E-05	3.25E-10
3383	473900	3782860	2.61E-09	5.63E-05	0	2.03E-05	2.66E-10
3384	474400	3782860	2.82E-09	6.07E-05	0	2.19E-05	2.87E-10
3385	474900	3782860	3.57E-09	7.69E-05	0	2.78E-05	3.64E-10
3386	475400	3782860	3.07E-09	6.62E-05	0	2.39E-05	3.13E-10
3387	457900	3783360	8.42E-09	0.00018154	2.95E-05	6.55E-05	8.58E-10
3388	458400	3783360	1.11E-08	0.00023895	5.17E-05	8.63E-05	1.13E-09
3389	458900	3783360	1.59E-08	0.00034194	3.29E-05	0.00012344	1.62E-09
3390	459400	3783360	2.30E-08	0.00049684	5.14E-05	0.00017936	2.35E-09
3391	459900	3783360	2.97E-08	0.00064021	7.21E-05	0.00023112	3.03E-09
3392	460400	3783360	3.69E-08	0.00079456	0.00010552	0.00028684	3.76E-09
3393	460900	3783360	4.23E-08	0.00091211	0.00017479	0.00032928	4.31E-09
3394	461400	3783360	4.57E-08	0.00098544	0.0001162	0.00035575	4.66E-09
3395	461900	3783360	4.63E-08	0.0009989	0.00011978	0.00036061	4.72E-09
3396	462400	3783360	3.92E-08	0.00084592	0.00019021	0.00030539	4.00E-09
3397	462900	3783360	2.62E-08	0.00056578	0.00018477	0.00020425	2.67E-09
3398	463400	3783360	2.18E-08	0.0004702	0.00024455	0.00016975	2.22E-09
3399	463900	3783360	3.28E-08	0.00070722	0.00032065	0.00025531	3.34E-09
3400	464400	3783360	3.78E-08	0.00081434	0.00041049	0.00029398	3.85E-09
3401	468900	3783360	6.47E-09	0.00013952	0	5.04E-05	6.60E-10
3402	469400	3783360	4.78E-09	0.00010299	0	3.72E-05	4.87E-10
3403	469900	3783360	5.40E-09	0.00011645	0	4.20E-05	5.51E-10
3404	470400	3783360	2.04E-09	4.39E-05	0	1.59E-05	2.08E-10
3405	470900	3783360	3.07E-09	6.62E-05	0	2.39E-05	3.13E-10
3406	471400	3783360	3.72E-09	8.02E-05	0	2.90E-05	3.79E-10
3407	471900	3783360	4.47E-09	9.64E-05	0	3.48E-05	4.56E-10
3408	472400	3783360	5.95E-09	0.00012826	0	4.63E-05	6.06E-10
3409	472900	3783360	2.23E-09	4.81E-05	2.06E-05	1.74E-05	2.27E-10
3410	473400	3783360	4.33E-10	9.34E-06	0	3.37E-06	4.41E-11
3411	473900	3783360	2.80E-10	6.04E-06	0	2.18E-06	2.86E-11
3412	474400	3783360	7.64E-10	1.65E-05	3.99E-06	5.95E-06	7.79E-11
3413	474900	3783360	1.81E-09	3.90E-05	0	1.41E-05	1.84E-10
3414	475400	3783360	9.43E-10	2.03E-05	0	7.34E-06	9.61E-11
3415	457900	3783860	1.24E-08	0.00026806	5.99E-05	9.68E-05	1.27E-09
3416	458400	3783860	1.56E-08	0.000337	2.80E-06	0.00012166	1.59E-09
3417	458900	3783860	1.91E-08	0.0004128	5.29E-05	0.00014902	1.95E-09
3418	459400	3783860	2.27E-08	0.0004886	2.95E-05	0.00017639	2.31E-09
3419	459900	3783860	2.23E-08	0.00047981	1.87E-05	0.00017322	2.27E-09
3420	460400	3783860	2.33E-08	0.00050179	6.33E-05	0.00018115	2.37E-09
3421	460900	3783860	2.10E-08	0.0004529	5.70E-05	0.0001635	2.14E-09
3422	461400	3783860	2.38E-08	0.0005136	0.0001135	0.00018541	2.43E-09
3423	461900	3783860	1.80E-08	0.00038808	0.00011147	0.0001401	1.83E-09
3424	462400	3783860	1.24E-08	0.00026669	0.00015862	9.63E-05	1.26E-09
3425	462900	3783860	1.23E-08	0.00026586	0.00011064	9.60E-05	1.26E-09
3426	463400	3783860	1.45E-08	0.00031255	0.0001806	0.00011283	1.48E-09
3427	463900	3783860	1.75E-08	0.00037737	0.00017697	0.00013623	1.78E-09
3428	464400	3783860	2.84E-08	0.00061302	0.00031182	0.00022131	2.90E-09
3429	464900	3783860	2.32E-08	0.00049931	0.00024822	0.00018026	2.36E-09
3430	465400	3783860	3.52E-08	0.00075968	0.00011385	0.00027425	3.59E-09
3431	465900	3783860	3.01E-08	0.00064982	0.00040757	0.00023459	3.07E-09
3432	466400	3783860	3.29E-08	0.00070832	0.00032335	0.00025571	3.35E-09

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3433	466900	3783860	2.27E-08	0.00048833	0	0.00017629	2.31E-09
3434	467400	3783860	1.54E-08	0.00033095	8.38E-05	0.00011948	1.56E-09
3435	467900	3783860	1.60E-08	0.00034469	3.36E-06	0.00012443	1.63E-09
3436	468400	3783860	1.39E-08	0.00029964	0	0.00010817	1.42E-09
3437	468900	3783860	3.59E-09	7.75E-05	0	2.80E-05	3.66E-10
3438	469400	3783860	7.86E-09	0.00016946	0	6.12E-05	8.01E-10
3439	469900	3783860	5.17E-09	0.00011151	1.52E-05	4.03E-05	5.27E-10
3440	470400	3783860	-3.60E-10	0	0	0	-4.11E-11
3441	470900	3783860	7.01E-10	1.51E-05	0	5.45E-06	7.14E-11
3442	471400	3783860	1.94E-09	4.17E-05	4.05E-05	1.51E-05	1.97E-10
3443	471900	3783860	-4.58E-10	0	0	0	-5.24E-11
3444	472400	3783860	-3.38E-10	0	1.68E-05	0	-3.86E-11
3445	472900	3783860	1.63E-09	3.52E-05	0	1.27E-05	1.66E-10
3446	473400	3783860	3.50E-09	7.55E-05	0	2.73E-05	3.57E-10
3447	473900	3783860	2.66E-09	5.74E-05	4.79E-06	2.07E-05	2.71E-10
3448	474400	3783860	1.06E-09	2.28E-05	1.11E-05	8.23E-06	1.08E-10
3449	474900	3783860	5.10E-11	1.10E-06	4.33E-07	3.97E-07	5.19E-12
3450	475400	3783860	-9.82E-11	0	0	0	-1.12E-11
3451	457900	3784360	1.28E-08	0.00027575	8.56E-06	9.95E-05	1.30E-09
3452	458400	3784360	1.43E-08	0.00030733	6.86E-05	0.00011095	1.45E-09
3453	458900	3784360	1.47E-08	0.00031585	2.70E-05	0.00011402	1.49E-09
3454	459400	3784360	1.37E-08	0.0002947	6.68E-05	0.00010639	1.39E-09
3455	459900	3784360	1.25E-08	0.00027053	4.69E-05	9.77E-05	1.28E-09
3456	460400	3784360	1.19E-08	0.00025625	5.55E-05	9.25E-05	1.21E-09
3457	460900	3784360	1.09E-08	0.00023428	6.55E-05	8.46E-05	1.11E-09
3458	461400	3784360	1.01E-08	0.00021752	0.00012184	7.85E-05	1.03E-09
3459	461900	3784360	9.52E-09	0.00020516	6.85E-05	7.41E-05	9.70E-10
3460	462400	3784360	9.40E-09	0.00020269	7.05E-05	7.32E-05	9.58E-10
3461	462900	3784360	9.06E-09	0.00019528	0.00015038	7.05E-05	9.23E-10
3462	463400	3784360	8.94E-09	0.0001928	9.42E-05	6.96E-05	9.11E-10
3463	463900	3784360	1.44E-08	0.00030981	0.00013372	0.00011184	1.46E-09
3464	464400	3784360	1.07E-08	0.00023126	0.0004196	8.35E-05	1.09E-09
3465	464900	3784360	1.79E-08	0.00038588	0.00023796	0.00013931	1.82E-09
3466	465400	3784360	2.18E-08	0.00046938	0.00017714	0.00016945	2.22E-09
3467	465900	3784360	1.83E-08	0.0003944	0.0002187	0.00014238	1.86E-09
3468	466400	3784360	1.92E-08	0.0004139	0.00032164	0.00014942	1.96E-09
3469	466900	3784360	1.37E-08	0.00029607	0.00015016	0.00010688	1.40E-09
3470	467400	3784360	5.40E-09	0.00011645	8.46E-05	4.20E-05	5.51E-10
3471	467900	3784360	6.88E-09	0.00014831	0.00029012	5.35E-05	7.01E-10
3472	468400	3784360	6.40E-09	0.00013787	0	4.98E-05	6.52E-10
3473	468900	3784360	4.59E-09	9.89E-05	0	3.57E-05	4.67E-10
3474	469400	3784360	-1.96E-10	0	0	0	-2.24E-11
3475	469900	3784360	1.77E-09	3.82E-05	0	1.38E-05	1.80E-10
3476	470400	3784360	3.25E-09	7.00E-05	0	2.53E-05	3.31E-10
3477	470900	3784360	-1.76E-09	0	0	0	-2.01E-10
3478	471400	3784360	-1.35E-09	0	0	0	-1.55E-10
3479	471900	3784360	1.12E-09	2.42E-05	0	8.73E-06	1.14E-10
3480	472400	3784360	8.79E-10	1.90E-05	0	6.84E-06	8.96E-11
3481	472900	3784360	-5.35E-10	0	1.00E-06	0	-6.11E-11
3482	473400	3784360	-1.31E-10	0	5.11E-06	0	-1.50E-11
3483	473900	3784360	3.57E-10	7.69E-06	0	2.78E-06	3.64E-11
3484	474400	3784360	1.78E-09	3.85E-05	0	1.39E-05	1.82E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3485	474900	3784360	2.28E-09	4.92E-05	0	1.77E-05	2.32E-10
3486	475400	3784360	1.64E-09	3.54E-05	3.67E-05	1.28E-05	1.67E-10
3487	457900	3784860	9.06E-09	0.00019528	5.45E-05	7.05E-05	9.23E-10
3488	458400	3784860	9.61E-09	0.00020709	5.71E-05	7.48E-05	9.79E-10
3489	458900	3784860	9.17E-09	0.00019775	3.60E-05	7.14E-05	9.35E-10
3490	459400	3784860	8.05E-09	0.00017358	3.08E-05	6.27E-05	8.21E-10
3491	459900	3784860	7.49E-09	0.00016149	5.32E-05	5.83E-05	7.63E-10
3492	460400	3784860	6.18E-09	0.00013321	4.62E-05	4.81E-05	6.30E-10
3493	460900	3784860	6.05E-09	0.00013046	8.31E-05	4.71E-05	6.17E-10
3494	461400	3784860	6.08E-09	0.00013101	4.81E-05	4.73E-05	6.19E-10
3495	461900	3784860	7.76E-09	0.00016726	8.03E-05	6.04E-05	7.91E-10
3496	462400	3784860	6.82E-09	0.00014694	0.00010559	5.30E-05	6.95E-10
3497	462900	3784860	6.18E-09	0.00013321	3.18E-05	4.81E-05	6.30E-10
3498	463400	3784860	9.31E-09	0.00020077	6.36E-05	7.25E-05	9.49E-10
3499	463900	3784860	8.23E-09	0.00017742	0.00014864	6.41E-05	8.39E-10
3500	464400	3784860	9.29E-09	0.00020022	0.00014674	7.23E-05	9.47E-10
3501	464900	3784860	1.30E-08	0.00028124	2.86E-05	0.00010153	1.33E-09
3502	465400	3784860	1.28E-08	0.00027685	0.00038655	9.99E-05	1.31E-09
3503	465900	3784860	1.21E-08	0.00026037	4.85E-05	9.40E-05	1.23E-09
3504	466400	3784860	9.77E-09	0.00021066	0.00022086	7.60E-05	9.96E-10
3505	466900	3784860	8.73E-09	0.00018814	0.00019561	6.79E-05	8.89E-10
3506	467400	3784860	3.57E-10	7.69E-06	0	2.78E-06	3.64E-11
3507	467900	3784860	4.14E-09	8.93E-05	0.00020015	3.22E-05	4.22E-10
3508	468400	3784860	1.91E-09	4.12E-05	0.00020721	1.49E-05	1.95E-10
3509	468900	3784860	5.33E-09	0.0001148	9.99E-06	4.14E-05	5.43E-10
3510	469400	3784860	2.55E-10	5.49E-06	0	1.98E-06	2.60E-11
3511	469900	3784860	-1.88E-09	0	0	0	-2.14E-10
3512	470400	3784860	3.82E-10	8.24E-06	0	2.97E-06	3.90E-11
3513	470900	3784860	3.63E-09	7.83E-05	0	2.83E-05	3.70E-10
3514	471400	3784860	8.92E-11	1.92E-06	2.65E-05	6.94E-07	9.09E-12
3515	471900	3784860	-1.93E-09	0	0	0	-2.21E-10
3516	472400	3784860	4.20E-10	9.06E-06	0	3.27E-06	4.28E-11
3517	472900	3784860	1.18E-09	2.55E-05	0	9.22E-06	1.21E-10
3518	473400	3784860	7.13E-10	1.54E-05	6.03E-06	5.55E-06	7.27E-11
3519	473900	3784860	-1.20E-10	0	0	0	-1.37E-11
3520	474400	3784860	-5.68E-10	0	0	0	-6.48E-11
3521	474900	3784860	-1.90E-17	0	0	0	-7.52E-19
3522	475400	3784860	1.21E-09	2.61E-05	0	9.42E-06	1.23E-10
3523	457900	3785360	6.60E-09	0.00014227	2.94E-05	5.14E-05	6.73E-10
3524	458400	3785360	5.81E-09	0.00012524	1.67E-05	4.52E-05	5.92E-10
3525	458900	3785360	5.64E-09	0.00012167	3.63E-05	4.39E-05	5.75E-10
3526	459400	3785360	5.03E-09	0.00010849	3.94E-05	3.92E-05	5.13E-10
3527	459900	3785360	4.13E-09	8.90E-05	6.37E-05	3.21E-05	4.21E-10
3528	460400	3785360	3.97E-09	8.57E-05	6.09E-05	3.09E-05	4.05E-10
3529	460900	3785360	3.83E-09	8.27E-05	4.63E-05	2.98E-05	3.91E-10
3530	461400	3785360	5.35E-09	0.00011535	9.80E-05	4.16E-05	5.45E-10
3531	461900	3785360	4.82E-09	0.00010382	0.00011153	3.75E-05	4.91E-10
3532	462400	3785360	4.73E-09	0.0001019	1.73E-05	3.68E-05	4.82E-10
3533	462900	3785360	7.62E-09	0.00016424	4.09E-05	5.93E-05	7.76E-10
3534	463400	3785360	7.59E-09	0.00016369	1.74E-05	5.91E-05	7.74E-10
3535	463900	3785360	4.68E-09	0.0001008	9.42E-05	3.64E-05	4.77E-10
3536	464400	3785360	8.34E-09	0.0001799	0	6.49E-05	8.50E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3537	464900	3785360	1.08E-08	0.0002318	5.43E-05	8.37E-05	1.10E-09
3538	465400	3785360	7.12E-09	0.00015353	0.00025912	5.54E-05	7.26E-10
3539	465900	3785360	7.94E-09	0.00017111	0.0001148	6.18E-05	8.09E-10
3540	466400	3785360	6.08E-09	0.00013101	0.00011903	4.73E-05	6.19E-10
3541	466900	3785360	5.40E-09	0.00011645	4.42E-05	4.20E-05	5.51E-10
3542	467400	3785360	4.97E-10	1.07E-05	0	3.87E-06	5.06E-11
3543	467900	3785360	2.14E-09	4.61E-05	6.49E-05	1.67E-05	2.18E-10
3544	468400	3785360	2.29E-10	4.94E-06	9.99E-05	1.78E-06	2.34E-11
3545	468900	3785360	1.68E-09	3.63E-05	4.12E-05	1.31E-05	1.71E-10
3546	469400	3785360	2.68E-09	5.77E-05	0	2.08E-05	2.73E-10
3547	469900	3785360	-4.15E-10	0	8.24E-05	0	-4.74E-11
3548	470400	3785360	-5.79E-10	0	0	0	-6.61E-11
3549	470900	3785360	4.08E-10	8.79E-06	0	3.17E-06	4.15E-11
3550	471400	3785360	2.96E-09	6.37E-05	2.33E-05	2.30E-05	3.01E-10
3551	471900	3785360	9.05E-10	1.95E-05	0	7.04E-06	9.22E-11
3552	472400	3785360	-8.08E-10	0	2.71E-06	0	-9.23E-11
3553	472900	3785360	-2.07E-10	0	9.45E-07	0	-2.37E-11
3554	473400	3785360	9.68E-10	2.09E-05	0	7.54E-06	9.87E-11
3555	473900	3785360	9.56E-10	2.06E-05	0	7.44E-06	9.74E-11
3556	474400	3785360	4.59E-10	9.89E-06	0	3.57E-06	4.67E-11
3557	474900	3785360	-8.73E-11	0	0	0	-9.97E-12
3558	475400	3785360	8.92E-11	1.92E-06	0	6.94E-07	9.09E-12
3559	457900	3785860	4.52E-09	9.75E-05	2.40E-05	3.52E-05	4.61E-10
3560	458400	3785860	3.50E-09	7.55E-05	2.98E-05	2.73E-05	3.57E-10
3561	458900	3785860	3.38E-09	7.28E-05	3.35E-05	2.63E-05	3.44E-10
3562	459400	3785860	2.89E-09	6.23E-05	5.81E-05	2.25E-05	2.95E-10
3563	459900	3785860	2.46E-09	5.30E-05	6.21E-05	1.91E-05	2.51E-10
3564	460400	3785860	2.79E-09	6.01E-05	3.52E-05	2.17E-05	2.84E-10
3565	460900	3785860	4.03E-09	8.68E-05	6.05E-05	3.13E-05	4.10E-10
3566	461400	3785860	3.22E-09	6.95E-05	7.92E-05	2.51E-05	3.28E-10
3567	461900	3785860	3.43E-09	7.39E-05	7.30E-06	2.67E-05	3.49E-10
3568	462400	3785860	5.30E-09	0.00011425	0.00010668	4.12E-05	5.40E-10
3569	462900	3785860	6.38E-09	0.0001376	0.00014963	4.97E-05	6.51E-10
3570	463400	3785860	3.01E-09	6.48E-05	0.00014926	2.34E-05	3.06E-10
3571	463900	3785860	4.97E-09	0.00010711	3.60E-05	3.87E-05	5.06E-10
3572	464400	3785860	6.41E-09	0.00013815	0.00014193	4.99E-05	6.53E-10
3573	464900	3785860	7.52E-09	0.00016204	7.94E-05	5.85E-05	7.66E-10
3574	465400	3785860	2.99E-09	6.45E-05	1.69E-06	2.33E-05	3.05E-10
3575	465900	3785860	5.33E-09	0.0001148	8.91E-05	4.14E-05	5.43E-10
3576	466400	3785860	4.14E-09	8.93E-05	6.00E-05	3.22E-05	4.22E-10
3577	466900	3785860	3.12E-09	6.73E-05	6.88E-05	2.43E-05	3.18E-10
3578	467400	3785860	1.50E-09	3.24E-05	0	1.17E-05	1.53E-10
3579	467900	3785860	-4.69E-10	0	2.54E-05	0	-5.36E-11
3580	468400	3785860	2.24E-09	4.83E-05	3.15E-05	1.75E-05	2.29E-10
3581	468900	3785860	-1.00E-09	0	2.24E-07	0	-1.15E-10
3582	469400	3785860	2.65E-09	5.71E-05	0	2.06E-05	2.70E-10
3583	469900	3785860	8.15E-10	1.76E-05	0	6.35E-06	8.31E-11
3584	470400	3785860	-3.60E-10	0	1.50E-05	0	-4.11E-11
3585	470900	3785860	-4.80E-10	0	0	0	-5.49E-11
3586	471400	3785860	4.71E-10	1.02E-05	0	3.67E-06	4.80E-11
3587	471900	3785860	2.09E-09	4.50E-05	5.60E-05	1.63E-05	2.13E-10
3588	472400	3785860	6.75E-10	1.46E-05	0	5.26E-06	6.88E-11

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3589	472900	3785860	1.78E-10	3.85E-06	0	1.39E-06	1.82E-11
3590	473400	3785860	-1.34E-09	0	0	0	-1.53E-10
3591	473900	3785860	-1.96E-10	0	0	0	-2.24E-11
3592	474400	3785860	6.50E-10	1.40E-05	0	5.06E-06	6.62E-11
3593	474900	3785860	4.33E-10	9.34E-06	4.02E-05	3.37E-06	4.41E-11
3594	475400	3785860	8.92E-11	1.92E-06	8.84E-06	6.94E-07	9.09E-12
3595	457900	3786360	2.56E-09	5.52E-05	2.07E-05	1.99E-05	2.61E-10
3596	458400	3786360	2.38E-09	5.14E-05	3.59E-05	1.85E-05	2.43E-10
3597	458900	3786360	2.37E-09	5.11E-05	2.15E-05	1.84E-05	2.42E-10
3598	459400	3786360	2.22E-09	4.78E-05	1.79E-05	1.73E-05	2.26E-10
3599	459900	3786360	2.52E-09	5.44E-05	3.40E-05	1.96E-05	2.57E-10
3600	460400	3786360	2.88E-09	6.21E-05	5.84E-05	2.24E-05	2.93E-10
3601	460900	3786360	2.23E-09	4.81E-05	4.61E-05	1.74E-05	2.27E-10
3602	461400	3786360	2.24E-09	4.83E-05	2.48E-05	1.75E-05	2.29E-10
3603	461900	3786360	3.85E-09	8.29E-05	8.22E-05	2.99E-05	3.92E-10
3604	462400	3786360	5.02E-09	0.00010821	0.000102	3.91E-05	5.12E-10
3605	462900	3786360	2.62E-09	5.66E-05	9.54E-05	2.04E-05	2.67E-10
3606	463400	3786360	3.01E-09	6.48E-05	3.78E-05	2.34E-05	3.06E-10
3607	463900	3786360	4.61E-09	9.94E-05	1.20E-05	3.59E-05	4.70E-10
3608	464400	3786360	4.46E-09	9.61E-05	8.22E-05	3.47E-05	4.54E-10
3609	464900	3786360	3.80E-09	8.18E-05	7.23E-05	2.95E-05	3.87E-10
3610	465400	3786360	2.41E-09	5.19E-05	4.34E-05	1.87E-05	2.45E-10
3611	465900	3786360	3.30E-09	7.11E-05	0.00010339	2.57E-05	3.36E-10
3612	466400	3786360	2.98E-09	6.43E-05	4.77E-05	2.32E-05	3.04E-10
3613	466900	3786360	1.49E-09	3.21E-05	5.35E-05	1.16E-05	1.52E-10
3614	467400	3786360	2.48E-09	5.36E-05	5.05E-05	1.93E-05	2.53E-10
3615	467900	3786360	-1.24E-09	0	1.41E-05	0	-1.42E-10
3616	468400	3786360	2.32E-09	5.00E-05	7.12E-05	1.80E-05	2.36E-10
3617	468900	3786360	4.06E-09	8.76E-05	5.01E-05	3.16E-05	4.14E-10
3618	469400	3786360	5.99E-10	1.29E-05	0	4.66E-06	6.10E-11
3619	469900	3786360	2.22E-09	4.78E-05	0	1.73E-05	2.26E-10
3620	470400	3786360	2.68E-10	5.77E-06	0	2.08E-06	2.73E-11
3621	470900	3786360	-6.00E-10	0	0	0	-6.86E-11
3622	471400	3786360	-7.20E-10	0	0	0	-8.23E-11
3623	471900	3786360	1.27E-10	2.75E-06	0	9.92E-07	1.30E-11
3624	472400	3786360	1.29E-09	2.77E-05	1.46E-05	1.00E-05	1.31E-10
3625	472900	3786360	2.06E-09	4.45E-05	2.96E-05	1.61E-05	2.10E-10
3626	473400	3786360	2.42E-10	5.22E-06	0	1.88E-06	2.47E-11
3627	473900	3786360	-8.95E-10	0	1.12E-06	0	-1.02E-10
3628	474400	3786360	-4.26E-10	0	0	0	-4.86E-11
3629	474900	3786360	2.55E-10	5.49E-06	0	1.98E-06	2.60E-11
3630	475400	3786360	4.71E-10	1.02E-05	0	3.67E-06	4.80E-11
3631	457900	3786860	1.83E-09	3.96E-05	3.78E-05	1.43E-05	1.87E-10
3632	458400	3786860	1.73E-09	3.74E-05	1.10E-05	1.35E-05	1.77E-10
3633	458900	3786860	1.61E-09	3.46E-05	2.74E-05	1.25E-05	1.64E-10
3634	459400	3786860	2.38E-09	5.14E-05	3.48E-05	1.85E-05	2.43E-10
3635	459900	3786860	5.75E-09	0.00012387	3.18E-05	4.47E-05	5.86E-10
3636	460400	3786860	1.91E-09	4.12E-05	3.25E-05	1.49E-05	1.95E-10
3637	460900	3786860	1.83E-09	3.96E-05	1.10E-05	1.43E-05	1.87E-10
3638	461400	3786860	2.88E-09	6.21E-05	7.45E-05	2.24E-05	2.93E-10
3639	461900	3786860	3.86E-09	8.32E-05	5.72E-05	3.00E-05	3.93E-10
3640	462400	3786860	2.97E-09	6.40E-05	5.99E-06	2.31E-05	3.03E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3641	462900	3786860	1.76E-09	3.79E-05	4.86E-05	1.37E-05	1.79E-10
3642	463400	3786860	2.80E-09	6.04E-05	4.76E-05	2.18E-05	2.86E-10
3643	463900	3786860	3.34E-09	7.20E-05	8.61E-05	2.60E-05	3.40E-10
3644	464400	3786860	4.42E-09	9.53E-05	2.08E-06	3.44E-05	4.51E-10
3645	464900	3786860	1.95E-09	4.20E-05	5.67E-05	1.52E-05	1.99E-10
3646	465400	3786860	2.11E-09	4.56E-05	4.69E-06	1.65E-05	2.16E-10
3647	465900	3786860	2.47E-09	5.33E-05	0.00012371	1.92E-05	2.52E-10
3648	466400	3786860	2.47E-09	5.33E-05	4.95E-05	1.92E-05	2.52E-10
3649	466900	3786860	3.06E-10	6.59E-06	0	2.38E-06	3.12E-11
3650	467400	3786860	7.59E-09	0.00016369	2.49E-05	5.91E-05	7.74E-10
3651	467900	3786860	-6.22E-10	0	2.07E-05	0	-7.11E-11
3652	468400	3786860	8.28E-10	1.79E-05	1.74E-05	6.44E-06	8.44E-11
3653	468900	3786860	1.48E-09	3.19E-05	0	1.15E-05	1.51E-10
3654	469400	3786860	-1.09E-09	0	0	0	-1.25E-10
3655	469900	3786860	1.59E-09	3.43E-05	0	1.24E-05	1.62E-10
3656	470400	3786860	1.48E-09	3.19E-05	0	1.15E-05	1.51E-10
3657	470900	3786860	2.55E-10	5.49E-06	1.95E-06	1.98E-06	2.60E-11
3658	471400	3786860	7.52E-10	1.62E-05	0	5.85E-06	7.66E-11
3659	471900	3786860	-3.60E-10	0	0	0	-4.11E-11
3660	472400	3786860	2.29E-10	4.94E-06	0	1.78E-06	2.34E-11
3661	472900	3786860	1.13E-09	2.44E-05	0	8.82E-06	1.16E-10
3662	473400	3786860	1.53E-09	3.30E-05	3.61E-05	1.19E-05	1.56E-10
3663	473900	3786860	3.57E-10	7.69E-06	0	2.78E-06	3.64E-11
3664	474400	3786860	-3.49E-10	0	0	0	-3.99E-11
3665	474900	3786860	-1.64E-10	0	3.84E-05	0	-1.87E-11
3666	475400	3786860	-1.09E-11	0	1.13E-05	0	-1.25E-12
3667	457900	3787360	1.27E-09	2.75E-05	2.94E-05	9.92E-06	1.30E-10
3668	458400	3787360	1.52E-09	3.27E-05	3.14E-06	1.18E-05	1.55E-10
3669	458900	3787360	3.21E-09	6.92E-05	4.57E-05	2.50E-05	3.27E-10
3670	459400	3787360	1.82E-09	3.93E-05	4.30E-06	1.42E-05	1.86E-10
3671	459900	3787360	4.73E-09	0.0001019	2.25E-05	3.68E-05	4.82E-10
3672	460400	3787360	1.53E-09	3.30E-05	1.16E-05	1.19E-05	1.56E-10
3673	460900	3787360	2.23E-09	4.81E-05	8.07E-05	1.74E-05	2.27E-10
3674	461400	3787360	3.02E-09	6.51E-05	4.61E-06	2.35E-05	3.08E-10
3675	461900	3787360	2.94E-09	6.34E-05	3.53E-05	2.29E-05	3.00E-10
3676	462400	3787360	1.15E-09	2.47E-05	0.00010044	8.92E-06	1.17E-10
3677	462900	3787360	1.85E-09	3.98E-05	7.01E-05	1.44E-05	1.88E-10
3678	463400	3787360	2.70E-09	5.82E-05	6.36E-05	2.10E-05	2.75E-10
3679	463900	3787360	2.28E-09	4.92E-05	6.97E-05	1.77E-05	2.32E-10
3680	464400	3787360	3.43E-09	7.39E-05	4.58E-05	2.67E-05	3.49E-10
3681	464900	3787360	1.30E-09	2.80E-05	7.47E-05	1.01E-05	1.32E-10
3682	465400	3787360	2.09E-09	4.50E-05	2.00E-05	1.63E-05	2.13E-10
3683	465900	3787360	1.87E-09	4.04E-05	0.00010211	1.46E-05	1.91E-10
3684	466400	3787360	2.11E-09	4.56E-05	6.30E-05	1.65E-05	2.16E-10
3685	466900	3787360	-2.29E-10	0	0	0	-2.62E-11
3686	467400	3787360	1.85E-09	3.98E-05	4.76E-05	1.44E-05	1.88E-10
3687	467900	3787360	1.27E-11	2.75E-07	3.11E-05	9.91E-08	1.30E-12
3688	468400	3787360	-7.64E-11	0	5.04E-06	0	-8.73E-12
3689	468900	3787360	2.10E-09	4.53E-05	5.37E-05	1.64E-05	2.14E-10
3690	469400	3787360	2.42E-10	5.22E-06	1.55E-06	1.88E-06	2.47E-11
3691	469900	3787360	-7.64E-11	0	5.13E-05	0	-8.73E-12
3692	470400	3787360	1.29E-09	2.77E-05	6.20E-05	1.00E-05	1.31E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3693	470900	3787360	7.52E-10	1.62E-05	7.01E-06	5.85E-06	7.66E-11
3694	471400	3787360	-1.31E-10	0	0	0	-1.50E-11
3695	471900	3787360	-3.27E-11	0	0	0	-3.74E-12
3696	472400	3787360	-2.73E-10	0	0	0	-3.12E-11
3697	472900	3787360	1.78E-10	3.85E-06	1.22E-05	1.39E-06	1.82E-11
3698	473400	3787360	3.95E-10	8.51E-06	2.19E-05	3.07E-06	4.03E-11
3699	473900	3787360	3.44E-10	7.42E-06	1.71E-05	2.68E-06	3.51E-11
3700	474400	3787360	4.84E-10	1.04E-05	0	3.77E-06	4.93E-11
3701	474900	3787360	-6.55E-11	0	0	0	-7.48E-12
3702	475400	3787360	-5.46E-11	0	0	0	-6.23E-12
3703	457900	3787860	8.15E-10	1.76E-05	1.63E-05	6.35E-06	8.31E-11
3704	458400	3787860	1.04E-09	2.25E-05	3.81E-05	8.13E-06	1.06E-10
3705	458900	3787860	9.94E-10	2.14E-05	1.17E-05	7.73E-06	1.01E-10
3706	459400	3787860	2.50E-09	5.38E-05	1.47E-05	1.94E-05	2.54E-10
3707	459900	3787860	1.18E-09	2.55E-05	2.02E-05	9.22E-06	1.21E-10
3708	460400	3787860	1.77E-09	3.82E-05	5.76E-05	1.38E-05	1.80E-10
3709	460900	3787860	2.40E-09	5.16E-05	2.04E-05	1.86E-05	2.44E-10
3710	461400	3787860	2.52E-09	5.44E-05	6.52E-05	1.96E-05	2.57E-10
3711	461900	3787860	1.16E-09	2.50E-05	3.51E-05	9.02E-06	1.18E-10
3712	462400	3787860	1.25E-09	2.69E-05	1.04E-05	9.72E-06	1.27E-10
3713	462900	3787860	1.47E-09	3.16E-05	6.84E-05	1.14E-05	1.49E-10
3714	463400	3787860	2.17E-09	4.67E-05	0	1.69E-05	2.21E-10
3715	463900	3787860	2.33E-09	5.03E-05	6.21E-07	1.81E-05	2.38E-10
3716	464400	3787860	2.09E-09	4.50E-05	0.00010995	1.63E-05	2.13E-10
3717	464900	3787860	8.79E-10	1.90E-05	3.81E-05	6.84E-06	8.96E-11
3718	465400	3787860	5.86E-09	0.00012634	0	4.56E-05	5.97E-10
3719	465900	3787860	1.49E-09	3.21E-05	0.00010771	1.16E-05	1.52E-10
3720	466400	3787860	1.75E-09	3.76E-05	5.09E-05	1.36E-05	1.78E-10
3721	466900	3787860	-3.71E-10	0	0	0	-4.24E-11
3722	467400	3787860	4.71E-10	1.02E-05	1.86E-05	3.67E-06	4.80E-11
3723	467900	3787860	2.68E-10	5.77E-06	0	2.08E-06	2.73E-11
3724	468400	3787860	-1.86E-10	0	2.56E-05	0	-2.12E-11
3725	468900	3787860	1.52E-09	3.27E-05	6.96E-05	1.18E-05	1.55E-10
3726	469400	3787860	6.37E-10	1.37E-05	1.17E-06	4.96E-06	6.49E-11
3727	469900	3787860	-2.07E-10	0	0	0	-2.37E-11
3728	470400	3787860	2.42E-10	5.22E-06	0	1.88E-06	2.47E-11
3729	470900	3787860	2.80E-10	6.04E-06	5.91E-05	2.18E-06	2.86E-11
3730	471400	3787860	-2.18E-11	0	1.04E-05	0	-2.49E-12
3731	471900	3787860	-9.82E-11	0	4.88E-06	0	-1.12E-11
3732	472400	3787860	5.19E-17	3.62E-12	0	1.07E-12	2.23E-18
3733	472900	3787860	-1.09E-10	0	4.84E-06	0	-1.25E-11
3734	473400	3787860	-2.52E-18	0	3.83E-07	0	-3.15E-19
3735	473900	3787860	2.55E-11	5.49E-07	3.38E-06	1.98E-07	2.60E-12
3736	474400	3787860	5.10E-11	1.10E-06	1.27E-05	3.97E-07	5.19E-12
3737	474900	3787860	2.22E-17	2.21E-12	0	9.38E-13	6.38E-19
3738	475400	3787860	-1.09E-11	0	0	0	-1.25E-12
3739	457900	3788360	9.81E-10	2.11E-05	1.10E-05	7.63E-06	1.00E-10
3740	458400	3788360	8.66E-10	1.87E-05	1.71E-05	6.74E-06	8.83E-11
3741	458900	3788360	9.43E-10	2.03E-05	1.86E-05	7.34E-06	9.61E-11
3742	459400	3788360	1.07E-09	2.31E-05	1.16E-05	8.33E-06	1.09E-10
3743	459900	3788360	1.44E-09	3.10E-05	2.30E-05	1.12E-05	1.47E-10
3744	460400	3788360	1.90E-09	4.09E-05	1.45E-05	1.48E-05	1.93E-10

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3745	460900	3788360	2.13E-09	4.59E-05	2.93E-05	1.66E-05	2.17E-10
3746	461400	3788360	1.30E-09	2.80E-05	5.40E-06	1.01E-05	1.32E-10
3747	461900	3788360	7.01E-10	1.51E-05	2.18E-06	5.45E-06	7.14E-11
3748	462400	3788360	1.26E-09	2.72E-05	5.27E-05	9.82E-06	1.29E-10
3749	462900	3788360	1.83E-09	3.96E-05	8.16E-05	1.43E-05	1.87E-10
3750	463400	3788360	1.40E-09	3.02E-05	5.94E-05	1.09E-05	1.43E-10
3751	463900	3788360	2.40E-09	5.16E-05	6.66E-06	1.86E-05	2.44E-10
3752	464400	3788360	4.70E-09	0.00010135	4.60E-05	3.66E-05	4.79E-10
3753	464900	3788360	6.50E-10	1.40E-05	3.39E-05	5.06E-06	6.62E-11
3754	465400	3788360	1.58E-09	3.41E-05	4.30E-05	1.23E-05	1.61E-10
3755	465900	3788360	1.22E-09	2.64E-05	8.90E-05	9.52E-06	1.25E-10
3756	466400	3788360	8.41E-10	1.81E-05	2.73E-05	6.54E-06	8.57E-11
3757	466900	3788360	-4.37E-11	0	3.08E-05	0	-4.99E-12
3758	467400	3788360	3.31E-10	7.14E-06	2.34E-05	2.58E-06	3.38E-11
3759	467900	3788360	2.42E-10	5.22E-06	2.30E-05	1.88E-06	2.47E-11
3760	468400	3788360	2.29E-10	4.94E-06	0	1.78E-06	2.34E-11
3761	468900	3788360	3.57E-10	7.69E-06	1.15E-05	2.78E-06	3.64E-11
3762	469400	3788360	6.12E-10	1.32E-05	6.81E-05	4.76E-06	6.23E-11
3763	469900	3788360	5.10E-11	1.10E-06	0	3.97E-07	5.19E-12
3764	470400	3788360	3.82E-11	8.24E-07	0	2.97E-07	3.90E-12
3765	470900	3788360	3.82E-11	8.24E-07	8.05E-06	2.97E-07	3.90E-12
3766	471400	3788360	5.10E-11	1.10E-06	1.09E-05	3.97E-07	5.19E-12
3767	471900	3788360	-2.18E-11	0	7.88E-06	0	-2.49E-12
3768	472400	3788360	-4.37E-11	0	0	0	-4.99E-12
3769	472900	3788360	-5.46E-11	0	0	0	-6.23E-12
3770	473400	3788360	-2.18E-11	0	1.25E-06	0	-2.49E-12
3771	473900	3788360	2.51E-17	2.26E-12	7.47E-07	9.85E-13	9.84E-19
3772	474400	3788360	1.27E-11	2.75E-07	0	9.92E-08	1.30E-12
3773	474900	3788360	1.15E-10	2.47E-06	2.12E-05	8.92E-07	1.17E-11
3774	475400	3788360	1.15E-10	2.47E-06	3.01E-05	8.92E-07	1.17E-11
3775	457900	3788860	1.13E-09	2.44E-05	2.04E-05	8.82E-06	1.16E-10
3776	458400	3788860	9.30E-10	2.00E-05	2.00E-05	7.24E-06	9.48E-11
3777	458900	3788860	9.30E-10	2.00E-05	8.81E-06	7.24E-06	9.48E-11
3778	459400	3788860	1.17E-09	2.53E-05	1.93E-05	9.12E-06	1.19E-10
3779	459900	3788860	1.53E-09	3.30E-05	1.40E-05	1.19E-05	1.56E-10
3780	460400	3788860	1.73E-09	3.74E-05	0	1.35E-05	1.77E-10
3781	460900	3788860	1.41E-09	3.05E-05	5.49E-05	1.10E-05	1.44E-10
3782	461400	3788860	5.73E-10	1.24E-05	5.63E-05	4.46E-06	5.84E-11
3783	461900	3788860	1.04E-09	2.25E-05	1.26E-07	8.13E-06	1.06E-10
3784	462400	3788860	1.02E-09	2.20E-05	5.41E-05	7.93E-06	1.04E-10
3785	462900	3788860	1.62E-09	3.49E-05	0	1.26E-05	1.65E-10
3786	463400	3788860	1.18E-09	2.55E-05	3.80E-05	9.22E-06	1.21E-10
3787	463900	3788860	1.96E-09	4.23E-05	2.54E-05	1.53E-05	2.00E-10
3788	464400	3788860	6.88E-10	1.48E-05	0	5.35E-06	7.01E-11
3789	464900	3788860	4.84E-10	1.04E-05	2.33E-05	3.77E-06	4.93E-11
3790	465400	3788860	8.15E-10	1.76E-05	6.03E-05	6.35E-06	8.31E-11
3791	465900	3788860	1.01E-09	2.17E-05	4.24E-05	7.83E-06	1.03E-10
3792	466400	3788860	9.30E-10	2.00E-05	2.66E-05	7.24E-06	9.48E-11
3793	466900	3788860	1.02E-10	2.20E-06	3.17E-05	7.93E-07	1.04E-11
3794	467400	3788860	2.29E-10	4.94E-06	0	1.78E-06	2.34E-11
3795	467900	3788860	2.68E-10	5.77E-06	1.93E-05	2.08E-06	2.73E-11
3796	468400	3788860	2.04E-10	4.39E-06	0	1.59E-06	2.08E-11

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3797	468900	3788860	-6.55E-11	0	8.88E-06	0	-7.48E-12
3798	469400	3788860	2.80E-10	6.04E-06	3.54E-05	2.18E-06	2.86E-11
3799	469900	3788860	8.92E-11	1.92E-06	2.97E-06	6.94E-07	9.09E-12
3800	470400	3788860	1.27E-11	2.75E-07	0	9.92E-08	1.30E-12
3801	470900	3788860	3.82E-11	8.24E-07	4.04E-06	2.97E-07	3.90E-12
3802	471400	3788860	1.02E-10	2.20E-06	2.34E-06	7.93E-07	1.04E-11
3803	471900	3788860	2.55E-11	5.49E-07	3.44E-06	1.98E-07	2.60E-12
3804	472400	3788860	-5.46E-11	0	1.04E-05	0	-6.23E-12
3805	472900	3788860	-4.37E-11	0	0	0	-4.99E-12
3806	473400	3788860	-3.27E-11	0	0	0	-3.74E-12
3807	473900	3788860	-2.18E-11	0	5.33E-06	0	-2.49E-12
3808	474400	3788860	3.82E-11	8.24E-07	5.23E-06	2.97E-07	3.90E-12
3809	474900	3788860	6.37E-11	1.37E-06	7.65E-06	4.96E-07	6.49E-12
3810	475400	3788860	2.42E-10	5.22E-06	3.51E-05	1.88E-06	2.47E-11
3811	457900	3789360	7.39E-10	1.59E-05	2.18E-05	5.75E-06	7.53E-11
3812	458400	3789360	8.28E-10	1.79E-05	4.99E-06	6.44E-06	8.44E-11
3813	458900	3789360	9.81E-10	2.11E-05	1.55E-05	7.63E-06	1.00E-10
3814	459400	3789360	1.27E-09	2.75E-05	1.84E-05	9.92E-06	1.30E-10
3815	459900	3789360	1.43E-09	3.08E-05	4.21E-06	1.11E-05	1.45E-10
3816	460400	3789360	1.39E-09	2.99E-05	3.05E-05	1.08E-05	1.42E-10
3817	460900	3789360	6.12E-10	1.32E-05	1.31E-05	4.76E-06	6.23E-11
3818	461400	3789360	5.99E-10	1.29E-05	0	4.66E-06	6.10E-11
3819	461900	3789360	3.80E-09	8.18E-05	3.47E-05	2.95E-05	3.87E-10
3820	462400	3789360	1.21E-09	2.61E-05	6.44E-05	9.42E-06	1.23E-10
3821	462900	3789360	8.92E-10	1.92E-05	5.98E-05	6.94E-06	9.09E-11
3822	463400	3789360	1.06E-09	2.28E-05	8.83E-06	8.23E-06	1.08E-10
3823	463900	3789360	7.13E-10	1.54E-05	5.31E-05	5.55E-06	7.27E-11
3824	464400	3789360	7.01E-10	1.51E-05	7.87E-06	5.45E-06	7.14E-11
3825	464900	3789360	5.35E-10	1.15E-05	2.92E-05	4.16E-06	5.45E-11
3826	465400	3789360	3.06E-10	6.59E-06	1.83E-05	2.38E-06	3.12E-11
3827	465900	3789360	9.68E-10	2.09E-05	3.91E-05	7.54E-06	9.87E-11
3828	466400	3789360	2.68E-10	5.77E-06	1.12E-05	2.08E-06	2.73E-11
3829	466900	3789360	7.64E-11	1.65E-06	1.51E-05	5.95E-07	7.79E-12
3830	467400	3789360	1.91E-10	4.12E-06	0	1.49E-06	1.95E-11
3831	467900	3789360	1.78E-10	3.85E-06	0	1.39E-06	1.82E-11
3832	468400	3789360	1.66E-10	3.57E-06	0	1.29E-06	1.69E-11
3833	468900	3789360	1.27E-10	2.75E-06	1.14E-05	9.92E-07	1.30E-11
3834	469400	3789360	1.02E-10	2.20E-06	0	7.93E-07	1.04E-11
3835	469900	3789360	1.27E-10	2.75E-06	7.55E-06	9.92E-07	1.30E-11
3836	470400	3789360	-1.09E-11	0	0	0	-1.25E-12
3837	470900	3789360	-2.18E-11	0	1.05E-05	0	-2.49E-12
3838	471400	3789360	1.27E-10	2.75E-06	0	9.92E-07	1.30E-11
3839	471900	3789360	1.66E-10	3.57E-06	3.51E-05	1.29E-06	1.69E-11
3840	472400	3789360	-1.09E-11	0	0	0	-1.25E-12
3841	472900	3789360	-9.82E-11	0	8.39E-06	0	-1.12E-11
3842	473400	3789360	-3.27E-11	0	7.43E-06	0	-3.74E-12
3843	473900	3789360	-3.27E-11	0	0	0	-3.74E-12
3844	474400	3789360	-2.18E-11	0	4.76E-06	0	-2.49E-12
3845	474900	3789360	2.55E-11	5.49E-07	1.00E-05	1.98E-07	2.60E-12
3846	475400	3789360	3.82E-11	8.24E-07	9.30E-06	2.97E-07	3.90E-12
3847	457900	3789860	7.39E-10	1.59E-05	2.04E-06	5.75E-06	7.53E-11
3848	458400	3789860	8.28E-10	1.79E-05	1.10E-05	6.44E-06	8.44E-11

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3849	458900	3789860	1.06E-09	2.28E-05	1.46E-05	8.23E-06	1.08E-10
3850	459400	3789860	1.17E-09	2.53E-05	5.50E-06	9.12E-06	1.19E-10
3851	459900	3789860	1.31E-09	2.83E-05	3.73E-05	1.02E-05	1.34E-10
3852	460400	3789860	3.35E-09	7.22E-05	1.02E-05	2.61E-05	3.41E-10
3853	460900	3789860	3.19E-10	6.87E-06	2.78E-05	2.48E-06	3.25E-11
3854	461400	3789860	8.79E-10	1.90E-05	2.37E-05	6.84E-06	8.96E-11
3855	461900	3789860	4.71E-10	1.02E-05	4.84E-05	3.67E-06	4.80E-11
3856	462400	3789860	1.20E-09	2.58E-05	0	9.32E-06	1.22E-10
3857	462900	3789860	2.55E-10	5.49E-06	3.41E-05	1.98E-06	2.60E-11
3858	463400	3789860	8.66E-10	1.87E-05	2.24E-05	6.74E-06	8.83E-11
3859	463900	3789860	4.71E-10	1.02E-05	1.59E-05	3.67E-06	4.80E-11
3860	464400	3789860	8.54E-10	1.84E-05	3.54E-05	6.64E-06	8.70E-11
3861	464900	3789860	4.59E-10	9.89E-06	3.44E-05	3.57E-06	4.67E-11
3862	465400	3789860	2.04E-10	4.39E-06	0	1.59E-06	2.08E-11
3863	465900	3789860	2.80E-10	6.04E-06	3.65E-06	2.18E-06	2.86E-11
3864	466400	3789860	2.29E-10	4.94E-06	0	1.78E-06	2.34E-11
3865	466900	3789860	2.04E-10	4.39E-06	8.73E-06	1.59E-06	2.08E-11
3866	467400	3789860	1.66E-10	3.57E-06	0	1.29E-06	1.69E-11
3867	467900	3789860	1.66E-10	3.57E-06	3.43E-06	1.29E-06	1.69E-11
3868	468400	3789860	1.53E-10	3.30E-06	0	1.19E-06	1.56E-11
3869	468900	3789860	1.40E-10	3.02E-06	5.40E-06	1.09E-06	1.43E-11
3870	469400	3789860	6.37E-11	1.37E-06	4.86E-06	4.96E-07	6.49E-12
3871	469900	3789860	2.17E-10	4.67E-06	3.03E-05	1.69E-06	2.21E-11
3872	470400	3789860	1.15E-10	2.47E-06	0	8.92E-07	1.17E-11
3873	470900	3789860	-9.82E-11	0	0	0	-1.12E-11
3874	471400	3789860	-1.09E-11	0	0	0	-1.25E-12
3875	471900	3789860	2.17E-10	4.67E-06	1.05E-05	1.69E-06	2.21E-11
3876	472400	3789860	1.15E-10	2.47E-06	1.70E-05	8.92E-07	1.17E-11
3877	472900	3789860	-1.09E-11	0	1.08E-05	0	-1.25E-12
3878	473400	3789860	-4.37E-11	0	0	0	-4.99E-12
3879	473900	3789860	-3.27E-11	0	4.63E-06	0	-3.74E-12
3880	474400	3789860	-3.27E-11	0	0	0	-3.74E-12
3881	474900	3789860	-2.18E-11	0	3.11E-06	0	-2.49E-12
3882	475400	3789860	3.82E-11	8.24E-07	4.33E-06	2.97E-07	3.90E-12
3883	457900	3790360	7.01E-10	1.51E-05	5.39E-06	5.45E-06	7.14E-11
3884	458400	3790360	8.92E-10	1.92E-05	3.39E-05	6.94E-06	9.09E-11
3885	458900	3790360	9.94E-10	2.14E-05	1.70E-05	7.73E-06	1.01E-10
3886	459400	3790360	1.06E-09	2.28E-05	1.16E-05	8.23E-06	1.08E-10
3887	459900	3790360	7.52E-10	1.62E-05	2.57E-05	5.85E-06	7.66E-11
3888	460400	3790360	3.19E-10	6.87E-06	2.69E-05	2.48E-06	3.25E-11
3889	460900	3790360	6.12E-10	1.32E-05	0	4.76E-06	6.23E-11
3890	461400	3790360	4.08E-10	8.79E-06	2.00E-05	3.17E-06	4.15E-11
3891	461900	3790360	6.88E-10	1.48E-05	1.73E-05	5.35E-06	7.01E-11
3892	462400	3790360	5.61E-10	1.21E-05	1.55E-05	4.36E-06	5.71E-11
3893	462900	3790360	4.20E-10	9.06E-06	1.37E-06	3.27E-06	4.28E-11
3894	463400	3790360	6.62E-10	1.43E-05	2.95E-05	5.16E-06	6.75E-11
3895	463900	3790360	3.44E-10	7.42E-06	1.01E-05	2.68E-06	3.51E-11
3896	464400	3790360	2.93E-10	6.32E-06	7.19E-06	2.28E-06	2.99E-11
3897	464900	3790360	4.33E-10	9.34E-06	3.91E-05	3.37E-06	4.41E-11
3898	465400	3790360	1.53E-10	3.30E-06	0	1.19E-06	1.56E-11
3899	465900	3790360	2.42E-10	5.22E-06	2.46E-05	1.88E-06	2.47E-11
3900	466400	3790360	1.91E-10	4.12E-06	0	1.49E-06	1.95E-11

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
3901	466900	3790360	1.78E-10	3.85E-06	7.12E-06	1.39E-06	1.82E-11
3902	467400	3790360	1.40E-10	3.02E-06	0	1.09E-06	1.43E-11
3903	467900	3790360	1.40E-10	3.02E-06	0	1.09E-06	1.43E-11
3904	468400	3790360	1.53E-10	3.30E-06	0	1.19E-06	1.56E-11
3905	468900	3790360	1.40E-10	3.02E-06	2.46E-06	1.09E-06	1.43E-11
3906	469400	3790360	7.64E-11	1.65E-06	7.30E-06	5.95E-07	7.79E-12
3907	469900	3790360	8.92E-11	1.92E-06	0	6.94E-07	9.09E-12
3908	470400	3790360	1.15E-10	2.47E-06	6.07E-06	8.92E-07	1.17E-11
3909	470900	3790360	-1.09E-11	0	0	0	-1.25E-12
3910	471400	3790360	-1.63E-18	0	7.20E-06	0	-1.90E-19
3911	471900	3790360	8.92E-11	1.92E-06	5.12E-06	6.94E-07	9.09E-12
3912	472400	3790360	1.40E-10	3.02E-06	2.06E-05	1.09E-06	1.43E-11
3913	472900	3790360	5.10E-11	1.10E-06	6.48E-06	3.97E-07	5.19E-12
3914	473400	3790360	-6.55E-11	0	3.63E-06	0	-7.48E-12
3915	473900	3790360	-7.64E-11	0	9.97E-06	0	-8.73E-12
3916	474400	3790360	1.27E-11	2.75E-07	0	9.91E-08	1.30E-12
3917	474900	3790360	-2.18E-11	0	7.72E-07	0	-2.49E-12
3918	475400	3790360	-3.27E-11	0	3.24E-06	0	-3.74E-12
3919	466716	3782622	1.31E-07	0.0028141	0	0.0010159	1.33E-08
3920	467571.6	3781542	-3.21E-07	0	0	0	-3.67E-08
3921	466428.3	3780273	-6.03E-07	0	0	0	-6.88E-08
3922	466363.7	3780498	-9.76E-07	0	0	0	-1.11E-07
3923	466324.4	3780750	-1.56E-06	0	0	0	-1.79E-07
3924	466330	3780874	-1.80E-06	0	0	0	-2.05E-07
3925	466409.7	3780873	-4.17E-06	0	0	0	-4.76E-07
3926	466409.7	3780991	-4.52E-06	0	0	0	-5.17E-07
3927	466337.6	3780991	-1.11E-06	0	0	0	-1.27E-07
3928	466422.7	3781353	1.02E-05	0.21997	0.0029667	0.079411	1.04E-06
3929	466423.4	3781356	1.02E-05	0.21888	0.0028419	0.079016	1.03E-06
3930	466423.9	3781358	1.01E-05	0.21803	0.0027273	0.078712	1.03E-06
3931	466369.4	3781372	1.68E-05	0.3632	0.0064225	0.13112	1.72E-06
3932	466193.6	3780666	-4.30E-07	0	0	0	-4.91E-08
3933	466179	3780666	-3.54E-07	0	0	0	-4.05E-08
3934	465863	3781559	5.59E-06	0.12053	0.0033239	0.043514	5.70E-07
3935	465861.7	3781562	5.50E-06	0.11851	0.003172	0.042783	5.60E-07
3936	466018.5	3781562	1.13E-05	0.24341	0.0074582	0.087871	1.15E-06
3937	465913.8	3781858	2.00E-06	0.043186	0.0030309	0.015591	2.04E-07
3938	466061.7	3782391	3.59E-07	0.0077432	0.00066771	0.0027954	3.66E-08
3939	466312.1	3782482	2.81E-07	0.0060547	0.00051594	0.0021858	2.86E-08
3940	466352.7	3782413	3.23E-07	0.006972	0.00043941	0.0025169	3.30E-08
3941	466392.5	3782321	4.12E-07	0.0088866	0	0.0032081	4.20E-08
3942	466424.4	3782237	5.25E-07	0.011324	0	0.0040879	5.35E-08
3943	466444.6	3782174	6.31E-07	0.013594	0	0.0049075	6.43E-08
3944	466459.4	3782114	7.19E-07	0.015505	0	0.0055975	7.33E-08
3945	466467.9	3782061	8.12E-07	0.017504	0	0.006319	8.27E-08
3946	466475.3	3782005	9.26E-07	0.019971	0	0.0072099	9.44E-08
3947	466480.9	3781947	1.07E-06	0.023112	0	0.0083438	1.09E-07
3948	466480.9	3781882	1.28E-06	0.027621	0	0.0099715	1.31E-07
3949	466479	3781832	1.49E-06	0.032085	0	0.011583	1.52E-07
3950	466477.7	3781785	1.71E-06	0.036949	0.00018096	0.013339	1.75E-07
3951	466471.4	3781727	2.07E-06	0.044612	0.0012575	0.016105	2.11E-07
3952	466457.3	3781657	2.77E-06	0.059722	0.0016119	0.02156	2.82E-07

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3953	466433.5	3781561	4.45E-06	0.096006	0	0.034659	4.54E-07
3954	466472.7	3781560	3.51E-06	0.075644	0	0.027308	3.58E-07
3955	466500.1	3781694	2.00E-06	0.043216	0	0.015601	2.04E-07
3956	466513.9	3781863	1.17E-06	0.025251	0	0.0091159	1.19E-07
3957	466513.9	3782013	8.10E-07	0.017464	0	0.0063048	8.26E-08
3958	466484.6	3782165	5.03E-07	0.01084	0	0.0039132	5.12E-08
3959	466441.5	3782299	3.54E-07	0.0076221	0	0.0027516	3.60E-08
3960	466388	3782427	2.78E-07	0.006003	7.05E-06	0.0021671	2.84E-08
3961	466353.4	3782495	2.47E-07	0.0053139	0.00080943	0.0019184	2.51E-08
3962	466746.6	3782584	1.37E-07	0.0029539	0	0.0010664	1.40E-08
3963	466777.1	3782545	1.43E-07	0.003081	0	0.0011123	1.46E-08
3964	466807.7	3782506	1.48E-07	0.0031846	0	0.0011497	1.51E-08
3965	466838.2	3782468	1.55E-07	0.0033521	0	0.0012101	1.58E-08
3966	466868.8	3782429	1.62E-07	0.0034996	0	0.0012634	1.65E-08
3967	466899.3	3782391	1.68E-07	0.0036158	0	0.0013053	1.71E-08
3968	466929.9	3782352	1.72E-07	0.0037152	0	0.0013412	1.76E-08
3969	466960.5	3782314	1.79E-07	0.0038572	0	0.0013925	1.82E-08
3970	466991	3782275	1.80E-07	0.0038726	0	0.001398	1.83E-08
3971	467021.6	3782236	1.66E-07	0.0035732	0	0.00129	1.69E-08
3972	467052.1	3782198	1.49E-07	0.0032016	0	0.0011558	1.51E-08
3973	467082.7	3782159	1.27E-07	0.00273	0	0.00098556	1.29E-08
3974	467113.3	3782121	9.60E-08	0.0020695	0	0.0007471	9.78E-09
3975	467143.8	3782082	6.07E-08	0.0013095	0	0.00047275	6.19E-09
3976	467174.4	3782043	2.26E-08	0.00048668	0	0.0001757	2.30E-09
3977	467204.9	3782005	-2.64E-08	0	0	0	-3.01E-09
3978	467235.5	3781966	-8.04E-08	0	0	0	-9.18E-09
3979	467266.1	3781928	-1.16E-07	0	0	0	-1.32E-08
3980	467296.6	3781889	-1.46E-07	0	0	0	-1.67E-08
3981	467327.2	3781851	-1.79E-07	0	0	0	-2.04E-08
3982	467357.7	3781812	-2.16E-07	0	0	0	-2.47E-08
3983	467388.3	3781773	-2.42E-07	0	0	0	-2.77E-08
3984	467418.9	3781735	-2.69E-07	0	0	0	-3.07E-08
3985	467449.4	3781696	-2.97E-07	0	0	0	-3.39E-08
3986	467480	3781658	-3.06E-07	0	0	0	-3.49E-08
3987	467510.5	3781619	-3.12E-07	0	0	0	-3.56E-08
3988	467541.1	3781580	-3.16E-07	0	0	0	-3.61E-08
3989	467539	3781506	-3.65E-07	0	0	0	-4.17E-08
3990	467506.3	3781469	-4.18E-07	0	0	0	-4.78E-08
3991	467473.6	3781433	-4.85E-07	0	0	0	-5.54E-08
3992	467441	3781397	-5.70E-07	0	0	0	-6.51E-08
3993	467408.3	3781361	-6.79E-07	0	0	0	-7.75E-08
3994	467375.6	3781324	-8.19E-07	0	0	0	-9.36E-08
3995	467343	3781288	-1.00E-06	0	0	0	-1.14E-07
3996	467310.3	3781252	-1.24E-06	0	0	0	-1.42E-07
3997	467277.6	3781216	-1.56E-06	0	0	0	-1.78E-07
3998	467245	3781179	-1.97E-06	0	0	0	-2.25E-07
3999	467212.3	3781143	-2.50E-06	0	0	0	-2.86E-07
4000	467179.6	3781107	-3.19E-06	0	0	0	-3.64E-07
4001	467147	3781071	-4.02E-06	0	0	0	-4.60E-07
4002	467114.3	3781034	-4.99E-06	0	0	0	-5.70E-07
4003	467081.6	3780998	-5.99E-06	0	0	0	-6.84E-07
4004	467049	3780962	-6.85E-06	0	0	0	-7.82E-07

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4005	467016.3	3780926	-7.40E-06	0	0	0	-8.45E-07
4006	466983.6	3780889	-7.56E-06	0	0	0	-8.64E-07
4007	466951	3780853	-7.39E-06	0	0	0	-8.44E-07
4008	466918.3	3780817	-6.98E-06	0	0	0	-7.97E-07
4009	466885.6	3780780	-6.40E-06	0	0	0	-7.31E-07
4010	466853	3780744	-5.71E-06	0	0	0	-6.52E-07
4011	466820.3	3780708	-4.97E-06	0	0	0	-5.68E-07
4012	466787.6	3780672	-4.24E-06	0	0	0	-4.85E-07
4013	466755	3780635	-3.57E-06	0	0	0	-4.08E-07
4014	466722.3	3780599	-2.99E-06	0	0	0	-3.41E-07
4015	466689.6	3780563	-2.48E-06	0	0	0	-2.84E-07
4016	466657	3780527	-2.07E-06	0	0	0	-2.36E-07
4017	466624.3	3780490	-1.72E-06	0	0	0	-1.96E-07
4018	466591.6	3780454	-1.43E-06	0	0	0	-1.64E-07
4019	466559	3780418	-1.20E-06	0	0	0	-1.37E-07
4020	466526.3	3780382	-1.00E-06	0	0	0	-1.15E-07
4021	466493.6	3780345	-8.45E-07	0	0	0	-9.65E-08
4022	466461	3780309	-7.13E-07	0	0	0	-8.14E-08
4023	466415.4	3780318	-6.65E-07	0	0	0	-7.59E-08
4024	466402.5	3780363	-7.33E-07	0	0	0	-8.37E-08
4025	466389.5	3780408	-8.08E-07	0	0	0	-9.23E-08
4026	466376.6	3780453	-8.90E-07	0	0	0	-1.02E-07
4027	466357.2	3780540	-1.08E-06	0	0	0	-1.23E-07
4028	466350.6	3780582	-1.19E-06	0	0	0	-1.36E-07
4029	466344	3780624	-1.31E-06	0	0	0	-1.49E-07
4030	466337.5	3780666	-1.42E-06	0	0	0	-1.62E-07
4031	466330.9	3780708	-1.51E-06	0	0	0	-1.72E-07
4032	466326.3	3780791	-1.69E-06	0	0	0	-1.93E-07
4033	466328.1	3780833	-1.78E-06	0	0	0	-2.03E-07
4034	466369.8	3780873	-2.85E-06	0	0	0	-3.25E-07
4035	466409.7	3780912	-4.50E-06	0	0	0	-5.14E-07
4036	466409.7	3780952	-4.66E-06	0	0	0	-5.32E-07
4037	466373.7	3780991	-2.61E-06	0	0	0	-2.98E-07
4038	466348.3	3781036	-6.40E-07	0	0	0	-7.31E-08
4039	466358.9	3781081	2.20E-07	0.004741	0	0.0017115	2.24E-08
4040	466369.6	3781127	1.70E-06	0.036751	0.00080629	0.013267	1.74E-07
4041	466380.2	3781172	3.81E-06	0.082114	1.53E-05	0.029644	3.88E-07
4042	466390.8	3781217	6.33E-06	0.13644	0.0015707	0.049256	6.45E-07
4043	466401.5	3781262	8.80E-06	0.18962	0.0017289	0.068454	8.96E-07
4044	466412.1	3781308	1.03E-05	0.22228	0.0014685	0.080246	1.05E-06
4045	466396.7	3781365	1.31E-05	0.28143	0.0049848	0.1016	1.33E-06
4046	466357.7	3781325	1.92E-05	0.41339	0.0088364	0.14924	1.95E-06
4047	466346	3781278	1.76E-05	0.38031	0.0077949	0.13729	1.80E-06
4048	466334.3	3781231	1.36E-05	0.29314	0.006006	0.10583	1.39E-06
4049	466322.6	3781184	9.47E-06	0.20418	0.010366	0.073709	9.65E-07
4050	466310.8	3781137	6.13E-06	0.13218	0.0053933	0.047718	6.25E-07
4051	466299.1	3781090	3.76E-06	0.081042	0.0037703	0.029257	3.83E-07
4052	466287.4	3781042	2.11E-06	0.045555	0.0019419	0.016446	2.15E-07
4053	466275.7	3780995	1.03E-06	0.022149	0	0.0079961	1.05E-07
4054	466263.9	3780948	3.26E-07	0.0070258	0.0010152	0.0025364	3.32E-08
4055	466252.2	3780901	-7.96E-08	0	0	0	-9.10E-09
4056	466240.5	3780854	-2.83E-07	0	0	0	-3.23E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
4057	466228.8	3780807	-3.89E-07	0	0	0	-4.44E-08
4058	466217.1	3780760	-4.36E-07	0	0	0	-4.98E-08
4059	466205.3	3780713	-4.43E-07	0	0	0	-5.06E-08
4060	466162.3	3780713	-1.84E-07	0	0	0	-2.10E-08
4061	466145.7	3780760	7.32E-08	0.001577	0	0.00056932	7.46E-09
4062	466129.1	3780807	4.73E-07	0.010197	0	0.0036813	4.82E-08
4063	466112.4	3780854	1.01E-06	0.021834	0.00014703	0.0078821	1.03E-07
4064	466095.8	3780901	1.73E-06	0.037367	0.0019157	0.01349	1.77E-07
4065	466079.2	3780948	2.69E-06	0.057896	0.0034297	0.020901	2.74E-07
4066	466062.6	3780995	3.94E-06	0.084957	0.0055235	0.03067	4.02E-07
4067	466045.9	3781042	5.60E-06	0.1208	0.0090423	0.043611	5.71E-07
4068	466029.3	3781089	7.81E-06	0.1684	0.010155	0.060794	7.96E-07
4069	466012.7	3781136	1.07E-05	0.22982	0.01262	0.082966	1.09E-06
4070	465996	3781183	1.41E-05	0.3035	0.019246	0.10956	1.43E-06
4071	465979.4	3781230	1.73E-05	0.37267	0.013444	0.13454	1.76E-06
4072	465962.8	3781277	1.89E-05	0.40706	0.024323	0.14695	1.92E-06
4073	465946.1	3781324	1.80E-05	0.38903	0.021839	0.14044	1.84E-06
4074	465929.5	3781371	1.54E-05	0.33281	0.01561	0.12015	1.57E-06
4075	465912.9	3781418	1.23E-05	0.26506	0.013872	0.095688	1.25E-06
4076	465896.2	3781465	9.45E-06	0.20373	0.0077068	0.07355	9.63E-07
4077	465879.6	3781512	7.27E-06	0.15677	0.0059256	0.056596	7.41E-07
4078	465900.9	3781562	6.66E-06	0.14357	0.0028048	0.051831	6.79E-07
4079	465940.1	3781562	7.93E-06	0.17093	0.0046228	0.061706	8.08E-07
4080	465979.3	3781562	9.49E-06	0.20454	0.0059362	0.073841	9.67E-07
4081	466003.6	3781605	8.28E-06	0.17844	0.0048149	0.064419	8.44E-07
4082	465988.6	3781647	6.01E-06	0.12966	0.0045554	0.046809	6.13E-07
4083	465973.7	3781689	4.61E-06	0.099473	0.0040235	0.035911	4.70E-07
4084	465958.7	3781731	3.64E-06	0.078451	0.0036503	0.028321	3.71E-07
4085	465943.7	3781773	2.95E-06	0.06353	0.0033875	0.022935	3.00E-07
4086	465928.8	3781816	2.42E-06	0.052251	0.0033686	0.018863	2.47E-07
4087	465926.2	3781902	1.69E-06	0.036527	0.0018988	0.013186	1.73E-07
4088	465938.5	3781947	1.43E-06	0.030768	0.0017779	0.011108	1.45E-07
4089	465950.8	3781991	1.21E-06	0.026136	0.0026483	0.0094354	1.24E-07
4090	465963.1	3782036	1.04E-06	0.022481	0.0025013	0.0081157	1.06E-07
4091	465975.5	3782080	9.01E-07	0.019415	0.0018863	0.007009	9.18E-08
4092	465987.8	3782124	7.83E-07	0.016873	0.0012802	0.0060912	7.98E-08
4093	466000.1	3782169	6.77E-07	0.014592	0.0011599	0.0052678	6.90E-08
4094	466012.4	3782213	5.88E-07	0.012665	0.0012092	0.0045723	5.99E-08
4095	466024.8	3782257	5.14E-07	0.011088	0.00072516	0.0040027	5.24E-08
4096	466037.1	3782302	4.54E-07	0.0097871	0.00072674	0.0035332	4.63E-08
4097	466049.4	3782346	4.03E-07	0.0086817	0.00046457	0.0031342	4.10E-08
4098	466103.5	3782406	3.47E-07	0.007487	0.001247	0.0027029	3.54E-08
4099	466145.2	3782421	3.36E-07	0.0072508	0.0010384	0.0026176	3.43E-08
4100	466186.9	3782436	3.18E-07	0.0068451	0.001097	0.0024711	3.24E-08
4101	466228.6	3782451	3.00E-07	0.0064642	0.0013854	0.0023336	3.06E-08
4102	466270.4	3782467	2.84E-07	0.0061233	0.00059207	0.0022106	2.89E-08
4103	466332.4	3782447	3.04E-07	0.0065529	0.00049354	0.0023656	3.10E-08
4104	466366	3782382	3.47E-07	0.0074848	0.00018568	0.0027021	3.54E-08
4105	466379.2	3782352	3.77E-07	0.0081189	0	0.002931	3.84E-08
4106	466408.5	3782279	4.65E-07	0.010028	0	0.0036202	4.74E-08
4107	466434.5	3782205	5.77E-07	0.012448	0	0.0044938	5.88E-08
4108	466452	3782144	6.76E-07	0.014575	0	0.0052617	6.89E-08

REC	X	Y	30yr Residential Cancer Risk Sum	Max Residential Chronic Hazard Index	Max Acute Hazard Index	Max Worker Chronic Hazard Index	Worker Cancer Risk Sum
4109	466463.6	3782087	7.64E-07	0.01647	0	0.0059458	7.79E-08
4110	466471.6	3782033	8.67E-07	0.018698	0	0.0067503	8.84E-08
4111	466478.1	3781976	1.00E-06	0.021601	0	0.0077982	1.02E-07
4112	466480.9	3781914	1.17E-06	0.025226	0	0.0091067	1.19E-07
4113	466474.5	3781756	1.88E-06	0.04048	0.00076054	0.014614	1.91E-07
4114	466464.3	3781692	2.38E-06	0.051272	0.0019115	0.01851	2.42E-07
4115	466445.4	3781609	3.48E-06	0.07497	0.00019738	0.027065	3.54E-07
4116	466481.8	3781605	2.89E-06	0.062394	0	0.022525	2.95E-07
4117	466491	3781649	2.39E-06	0.051617	0	0.018634	2.44E-07
4118	466503.6	3781736	1.74E-06	0.037446	0	0.013518	1.77E-07
4119	466507	3781778	1.52E-06	0.032737	0	0.011818	1.55E-07
4120	466510.5	3781820	1.33E-06	0.02864	0	0.010339	1.35E-07
4121	466513.9	3781900	1.06E-06	0.022872	0	0.0082571	1.08E-07
4122	466513.9	3781938	9.54E-07	0.020569	0	0.0074257	9.72E-08
4123	466513.9	3781975	8.70E-07	0.018763	0	0.0067736	8.87E-08
4124	466506.6	3782051	6.95E-07	0.014986	0	0.0054101	7.08E-08
4125	466499.3	3782089	6.13E-07	0.013221	0	0.0047729	6.25E-08
4126	466491.9	3782127	5.50E-07	0.011865	0	0.0042834	5.61E-08
4127	466470.2	3782210	4.33E-07	0.0093389	0	0.0033714	4.42E-08
4128	466455.8	3782255	3.86E-07	0.0083178	0	0.0030028	3.93E-08
4129	466423.6	3782342	3.20E-07	0.0068885	0	0.0024868	3.26E-08
4130	466405.8	3782385	2.96E-07	0.0063757	0	0.0023017	3.01E-08
4131	466370.7	3782461	2.61E-07	0.0056311	0.00051518	0.0020329	2.66E-08
4132	466398.8	3782511	2.42E-07	0.0052244	0	0.0018861	2.47E-08
4133	466444.1	3782527	2.20E-07	0.0047528	0	0.0017158	2.25E-08
4134	466489.4	3782543	2.03E-07	0.0043686	0.00021593	0.0015771	2.07E-08
4135	466534.7	3782558	1.86E-07	0.0040173	0.00032841	0.0014503	1.90E-08
4136	466580	3782574	1.70E-07	0.0036726	0	0.0013258	1.74E-08
4137	466625.4	3782590	1.55E-07	0.0033428	0	0.0012068	1.58E-08
4138	466670.7	3782606	1.41E-07	0.003047	0	0.0011	1.44E-08

APPENDEIX G MODELING FILES

Modeling Files are available upon request from:

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APPENDIX C

Habitat Assessment for the Proposed Cajon Creek Consolidation Project (ELMT Consulting – 2023)

May 15, 2023

VULCAN MATERIALS COMPANY
Contact: James Gore
500 N. Brand Blvd., Suite 500
Glendale, California 91208

SUBJECT: Habitat Assessment for the Proposed Cajon Creek Consolidation Project

Executive Summary

This report contains the findings of ELMT Consulting's (ELMT) habitat assessment for Vulcan's proposed Cajon Creek Consolidation Project; specifically, ELMT's habitat assessment for Area K, northern portion of Area N, and the areas between Area L and Area Q, and the area between Area M and Area N in the City of San Bernardino, San Bernardino County, California (refer to Attachment A, *Site Plan*). The initial habitat assessment was conducted by biologists Thomas J. McGill, Ph.D., and Jacob H. Lloyd Davies on May 13, 2021 to document baseline conditions and assess the potential for special-status[1] plant and wildlife species to occur within the project site that could pose a constraint to implementation of the proposed project. An updated site visit was conducted on February 8, 2023. Special attention was given to the suitability of the project site to support San Bernardino kangaroo rat (*Dipodomys merriami parvus*), Santa Ana River woollystar (*Eriastrum densifolium sanctorum*), and other special-status plant and wildlife species identified by the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB), and other electronic databases as potentially occurring in the general vicinity of the project site.

As discussed in this report, the project site consists of both developed (mining areas) and undeveloped land that has been subject to a variety of human-related disturbances from existing mining activities and surrounding development. Four (4) plant communities were observed within the boundaries of Area K during the habitat assessment: highly disturbed and degraded Riversidean alluvial fan sage scrub (RAFSS), buckwheat scrub, non-native grassland, and ornamental. Due to the isolation of the site and the removal of all hydrologic influences of the Cajon Wash, the Area K no longer supports viable RAFSS habitat with long-term conservation value. However, as noted above, the isolated and senescing RAFSS habitats identified on the project site has either succeeded to upland chaparral habitat or is no longer functioning as viable RAFSS habitat with long-term conservation value and no mitigation is required. Area N has no plant communities or biological resources within the assessed area, as soils within Area N have been heavily disturbed from ongoing and historical mining activities. The interstitial areas between Areas M and N, and Areas L and Q support irrigated planted/landscaped ornamental vegetation with an understory of a mix of native and non-native plant species that have established.

Based on the proposed project footprint and existing site conditions discussed in this report, special-status

1 As used in this report, "special-status" refers to plant and wildlife species that are federally and State listed, proposed, or candidates; plant species that have been designated with a California Native Plant Society Rare Plant Rank; wildlife species that are designated by the CDFW as fully protected, species of special concern, or watch list species; and specially protected natural vegetation communities as designated by the CDFW.

plant and wildlife species are confirmed absent from the project site based on habitat surveys, habitat requirements, availability and quality of habitat needed by each species, and known distributions. Accordingly, implementation of the project will have "no effect" on federally or State listed species known to occur in the general vicinity of the project site.

Further, no jurisdictional drainage and/or wetland features were observed within the project site during the field survey.

Project Location

The project site is generally located southwest of Interstate 215, east of Interstate 15, and north of State Route 210 in the City of San Bernardino, San Bernardino County, California. The site is depicted on the San Bernardino North quadrangle of the United States Geological Survey's (USGS) 7.5-minute map series within an unsectioned portion of Township 1 North, Range 5 West. Specifically, the site bounded to the northeast by Cajon Boulevard and is located north of Road Runner Trail, south of Institution Road, and east of Cajon Creek. Refer to Exhibits 1-3 in Attachment B.

Methodology

A literature review and records search were conducted to determine which special-status biological resources have the potential to occur on or within the general vicinity of the project site. In addition to the literature review, a general habitat assessment or field investigation of the project site was conducted to document existing conditions and assess the potential for special-status biological resources to occur within the project site.

Literature Review

Prior to conducting the field investigation, a literature review and records search was conducted for special-status biological resources potentially occurring on or within the vicinity of the project site. Previously recorded occurrences of special-status plant and wildlife species and their proximity to the project site were determined through a query of the CDFW's QuickView Tool in the Biogeographic Information and Observation System (BIOS), CNDDB Rarefind 5, the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California, Calflora Database, compendia of special-status species published by CDFW, and the United States Fish and Wildlife Service (USFWS) species listings.

All available reports, survey results, and literature detailing the biological resources previously observed on or within the vicinity of the project site were reviewed to understand existing site conditions and note the extent of any disturbances that have occurred within the project site that would otherwise limit the distribution of special-status biological resources. Standard field guides and texts were reviewed for specific habitat requirements of special-status and non-special-status biological resources, as well as the following resources:

- Google Earth Pro historic aerial imagery (1985-2022);

- United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), Soil Survey[2];
- USFWS Critical Habitat designations for Threatened and Endangered Species; and
- USFWS Endangered Species Profiles.
- *Claremonters v. City of Claremont*, 2005 Cal. App. Unpub. LEXIS 9074

The literature review provided a baseline from which to inventory the biological resources potentially occurring within the project site. The CNDDB database was used, in conjunction with ArcGIS software, to locate the nearest recorded occurrences of special-status species and determine the distance from the project site.

Habitat Assessment/Field Investigation

Following the literature review, biologists Thomas J. McGill, Ph.D., and Jacob H. Lloyd Davies inventoried and evaluated the condition of the habitat within a 200-foot buffer around the project site, where applicable, on May 13, 2021. A follow up site visit was conducted on February 8, 2023 to confirm existing site conditions. Plant communities and land cover types identified on aerial photographs during the literature review were verified by walking meandering transects throughout the project site. In addition, aerial photography was reviewed prior to the site investigation to locate potential natural corridors and linkages that may support the movement of wildlife through the area. These areas identified on aerial photography were then walked during the field investigation.

Soil Series Assessment

On-site and adjoining soils were researched prior to the field investigation using the USDA NRCS Soil Survey for San Bernardino County, Southwestern Part. In addition, a review of the local geological conditions and historical aerial photographs was conducted to assess the ecological changes that the project site has undergone.

Plant Communities

Plant communities were mapped using 7.5-minute USGS topographic base maps and aerial photography. The plant communities were classified in accordance with Sawyer, Keeler-Wolf and Evens (2009), delineated on an aerial photograph, and then digitized into GIS Arcview. The Arcview application was used to compute the area of each plant community and/or land cover type in acres.

Plants

Common plant species observed during the field investigation were identified by visual characteristics and morphology in the field and recorded in a field notebook. Unusual and less-familiar plants were photographed in the field and identified in the laboratory using taxonomic guides. Taxonomic nomenclature used in this study follows the 2012 Jepson Manual (Hickman 2012). In this report, scientific names are provided immediately following common names of plant species (first reference only).

2 A soil series is defined as a group of soils with similar profiles developed from similar parent materials under comparable climatic and vegetation conditions. These profiles include major horizons with similar thickness, arrangement, and other important characteristics, which may promote favorable conditions for certain biological resources.

Wildlife

Wildlife species detected during the field investigation by sight, calls, tracks, scat, or other sign were recorded during surveys in a field notebook. Field guides used to assist with identification of wildlife species during the survey included The Sibley Field Guide to the Birds of Western North America (Sibley 2003), A Field Guide to Western Reptiles and Amphibians (Stebbins 2003), and A Field Guide to Mammals of North America (Reid 2006). Although common names of wildlife species are well standardized, scientific names are provided immediately following common names in this report (first reference only).

Jurisdictional Drainages and Wetlands

Aerial photography was reviewed prior to conducting a field investigation in order to locate and inspect any potential natural drainage features, ponded areas, or water bodies that may fall under the jurisdiction of the United States Army Corps of Engineers (Corps), Regional Water Quality Control Board (Regional Board), or CDFW. In general, surface drainage features indicated as blue-line streams on USGS maps that are observed or expected to exhibit evidence of flow are considered potential riparian/riverine habitat and are also subject to state and federal regulatory jurisdiction. In addition, ELMT reviewed jurisdictional waters information through examining historical aerial photographs to gain an understanding of the impact of land-use on natural drainage patterns in the area. The USFWS National Wetland Inventory (NWI) and Environmental Protection Agency (EPA) Water Program "My Waters" data layers were also reviewed to determine whether any hydrologic features and wetland areas have been documented on or within the vicinity of the project site.

Existing Site Conditions

The proposed project site is located in an area with a mixture of developed and undeveloped land along Cajon Creek. Surrounding developments include mixed industrial development to the north and east, residential development and vacant, undeveloped land to the south, and active mining operations associated with Vulcan Materials. Area K is generally undeveloped while the northern portion of Area N has been heavily disturbed from ongoing and historical mining activities. The interstitial areas between Areas M and N, and Areas L and Q support irrigated planted/landscaped ornamental vegetation. Refer to Attachment C, *Site Photographs*, for representative site photographs.

Topography and Soils

Elevation ranges from approximately 1,550 to 1,650 feet above mean sea level and generally slopes from northwest to southeast. Based on the NRCS USDA Web Soil Survey, the project site is historically underlain by Tujunga gravelly loamy sand (0 to 9 percent slopes) and Soboba gravelly loamy sand (0 to 9 percent slopes). Soils within Area K are relatively undisturbed, while soils within Area N and the interstitial areas have been heavily disturbed from mining activities.

Vegetation

Area N has no plant communities or biological resources within the assessed area, as soils within Area N have been heavily disturbed from ongoing and historical mining activities. Four (4) plant communities were observed within the boundaries of Area K during the habitat assessment: highly disturbed and degraded Riversidean alluvial fan sage scrub (RAFSS), buckwheat scrub, non-native grassland, and ornamental (refer to Exhibit 4, *Vegetation*, in Attachment B). In addition, the project site contains a land cover type that would

be classified as disturbed. These plant communities and land cover type are described in further detail below.

Riversidean Alluvial Fan Sage Scrub

Riversidean alluvial fan sage scrub (RAFSS) is generally considered a sensitive plant community and is listed by CDFW as rare. RAFSS is a vegetation type in which scale broom (*Lepidospartum squamatum*) is dominant, co-dominant, or conspicuous in the shrub canopy. Scale broom, a member of the aster family, is a long-lived, deep-rooted shrub found in riverine or alluvial soils, often in dry washes.

RAFSS is a community restricted to intermittently or rarely flooded, low-gradient alluvial deposits along streams, washes, and fans within large canyons on the coastal slopes of the San Gabriel Mountains and San Bernardino Mountains in San Bernardino County. This community is composed of a variety of drought-deciduous subshrubs and large evergreen woody shrubs. In addition to scale broom, woody shrubs such as chamise (*Adenostoma fasciculatum*), California buckwheat (*Eriogonum fasciculatum*), white sage (*Salvia apiana*), and yerba santa (*Eriodictyon trichocalyx*) are present in RAFSS. Common subshrubs include deerweed (*Acmispon glaber*), matchweed (*Gutierrezia californica*), and Douglas' nightshade (*Solanum douglasii*). Native species found within the herbaceous understory include fiddleneck (*Amsinckia menziesii*), croton (*Croton californicus*), and cryptantha (*Cryptantha* spp.). Due to intense, periodic flooding and erosion within the alluvial plain, a series of step-like terraces are created above wash channels, each exhibiting a different successional phase. These phases are related to the amount of time elapsed since the most recent flood and occur as a sequential gradation of terrace types with increasing distance from the active channel.

These three phases, as well as two associated terrace levels of RAFSS plant communities have been described by Sharon Lockhart for the areas within and adjacent to what is now known as the Cajon Creek Conservation Bank and for additional properties owned by Vulcan in the vicinity of the Conservation Bank (Lockhart and Chambers 1995). The descriptions and the locations of the phases and terrace levels found within the project area and surrounding vicinity are provided below:

Terrace 1 Young or Pioneer Phase:

Sparsely vegetated with low species diversity and it is typically located within active stream channels or recently scoured streambeds. This terrace requires approximately 3 to 6 years to become established after a flood disturbance. Vegetation that fits this phase or terrace designation is present at the southwestern end of the project area along the active stream channel of Cajon Creek. The storm drain will discharge into Terrace 1 vegetation in Cajon Creek.

Terrace 2 Intermediate Phase:

Consists of relatively dense vegetation dominated by scale broom and California buckwheat, as well as grasses and other herbaceous species. This terrace requires approximately 5 to 14 years to become established after a flood disturbance.

Terrace 3 Old or Mature Phase:

Denser that Terrace 2, but includes yerba santa, cacti (*Opuntia* spp.), and chaparral yucca (*Hesperoyucca whipplei*). Very few annual species are present. This terrace requires approximately 6 to 18 years to become established after a flood disturbance.

Terrace 4 Isolated Phase:

Consists of other fully developed shrubs such as chamise, yerba santa, white sage, black sage (*Salvia mellifera*), and chaparral yucca. Emergent trees including mountain mahogany (*Cercocarpus betuloides*) and blue elderberry (*Sambucus nigra ssp. caerulea*) are also present at low cover. This terrace requires up to 15 years to become established after a flood disturbance.

Terrace 5 Isolated Phase:

Terrace 5 is another designation that was given to terraces located outside of the floodplain that are cut off from the active stream channel. Terrace type 5 vegetation occurs outside the floodplain in the portion of the project area located east of the Union Pacific railroad track embankment. This terrace has been cut off from the active stream channel by the Southern Pacific railroad embankment. Terrace 5 vegetation is succeeding to upland chaparral. Additional species present in this terrace include bigpod ceanothus (*Ceanothus megacarpus*), laurel sumac (*Malosma laurina*), holly-leaved cherry (*Prunus ilicifolia*), and California sycamore (*Platanus racemosa*).

The isolated and senescing RAFSS habitat that occurs on the project site is classified as Terrace 5. The disturbed and degraded habitats have either succeeded to upland chaparral habitat or are no longer functioning as viable RAFSS habitat with long-term conservation value for the following reasons.

The RAFSS habitat is isolated from the historic fluvial flow patterns and scouring regimes due to existing mining activities and surrounding development. The project site is bordered on the east by Cajon Boulevard and industrial development. Specifically, the Union Pacific Railroad's tracks and man-made berm are located west of the project site, which prevent the project site and adjacent areas from being subject to the hydrologic regime of the Cajon Wash. Further, the Union Pacific Railroad has isolated and separated the project site's RAFSS habitat from less disturbed RAFSS vegetation off-site, especially in Cajon Wash.

The elimination of fluvial processes from the project area has removed the physical and biotic attributes needed to support viable RAFSS habitat and special-status plant and wildlife species. Flooding events vital to maintaining this plant community have not occurred in the general vicinity for over 50 years. Further, the RAFSS habitat is not occupied by any listed or otherwise special-status plant or wildlife species, indicating minimal or no value as biological habitat.

Plant species observed within this plant community include California buckwheat (*Eriogonum fasciculatum*), white sage (*Salvia apiana*), Russian thistle (*Salsola tragus*), chamise (*Adenostoma fasciculatum*), wild oat (*Avena fatua*), brome grasses (*Bromus* sp.), jimsonweed (*Datura wrightii*), Mediterranean mustard (*Hirschfeldia incana*), tocalote (*Centaurea melitensis*), mountain mahogany (*Cercocarpus betuloides*), sunflower (*Helianthus* sp.), basketbush (*Rhus trilobata*), California sagebrush (*Artemisia californica*), clustered tarweed (*Deinandra fasciculata*), California croton (*Croton californicus*),

prickly pear (*Opuntia littoralis*), telegraph weed (*Heterotheca grandiflora*), brittlebush (*Encelia farinosa*), spiny redberry (*Rhamnus crocea*), western ragweed (*Ambrosia psilostachya*), scalebroom (*Lepidospartum squamatum*), deerweed (*Acmispon glaber*), spurge (*Euphorbia* sp.), doveweed (*Croton setigerus*), horseweed (*Erigeron canadensis*), wire lettuce (*Stephanomeria* sp.), holly-leaved cherry (*Prunus ilicifolia*), chaparral yucca (*Hesperoyucca whipplei*), hairy yerba santa (*Eriodictyon trichocalyx*), and castor bean (*Ricinus communis*).

Accordingly, the loss of the disturbed, degraded, fragmented, low-quality RAFSS on the project site is not considered a significant impact and requires no mitigation.

Buckwheat Scrub

The buckwheat scrub plant community is located on the southern boundary of Area K. This portion of the project site historically supported a RAFSS plant community, however, anthropogenic disturbances have thinned this plant community resulting in an open monoculture of California buckwheat, with non-native grasses intermixed.

Non-Native Grassland

The southern western portion of Area K support a non-native grassland plant community. This vegetation community is densely vegetated with non-native grasses such as red brome and Mediterranean grass and supports mainly weedy/ruderal early successional species. Common plant species observed in this vegetation community include Mediterranean mustard, Russian thistle, and western ragweed.

Ornamental

Ornamental vegetation is found in the interstitial areas between Areas M and N, and Areas L and Q. These ornamental vegetation stands consist of various pine trees (*Pinus* sp.), Peruvian pepper (*Schinus molle*), Brazilian pepper (*Schinus terebinthifolius*), and jacaranda (*Jacaranda mimosifolia*) that have been planted as a visual screen.

Disturbed

Disturbed areas refer to unpaved or dirt areas that are routinely exposed to anthropogenic disturbances and typically do not support native vegetation or comprise a plant community. Surface soils within these areas are generally devoid of vegetation and have been heavily disturbed/compacted from residential land uses. Within the project site, disturbed areas generally encompass dirt roads and areas that have been subject to existing mining activities.

The northern portion of Area N lies west of the southern portion of Area K. The northern portion of Area N has been used as a storage yard for heavy equipment for several decades and does not support vegetation, native or non-native. Gravel is routinely applied to the open soils within the area to continue dust and to keep the area drivable for service vehicles. As a result, there are no biological resources within the northern portion of Area N.

Wildlife

Plant communities provide foraging habitat, nesting/denning sites, and shelter from adverse weather or

predation. This section provides a discussion of those wildlife species that were observed or are expected to occur within the project site. The discussion is to be used a general reference and is limited by the season, time of day, and weather conditions in which the field investigation was conducted. Wildlife detections were based on calls, songs, scat, tracks, burrows, and direct observation. The project site provides limited habitat for wildlife species except those adapted to a high degree of anthropogenic disturbances and development.

Fish

No fish or hydrogeomorphic features (e.g., perennial creeks, ponds, lakes, reservoirs) that would provide suitable habitat for fish were observed on or within the vicinity of the project site. Therefore, no fish are expected to occur and are presumed absent from the project site.

Amphibians

No amphibians or hydrogeomorphic features (e.g., perennial creeks, ponds, lakes, reservoirs) that would provide suitable habitat for amphibian species were observed on or within the vicinity of the project site. Therefore, no amphibians are expected to occur on the project site and are presumed absent.

Reptiles

The survey area provides suitable habitat for a variety of reptile species known to occur within the region. Reptile species observed during the field investigation included great basin whiptail (*Aspidoscelis tigris tigris*) and western side-blotched lizard (*Uta stansburiana elegans*). Additional common reptile species that could potentially occur on-site include San Diego gopher snake (*Pituophis catenifer annesctens*), San Diego alligator lizard (*Elgaria multicarinata webbii*), southern pacific rattlesnake (*Crotalus oreganus helleri*), and red racer (*Coluber flagellum piceus*). These reptilian species are not special-status species, and no mitigation is required.

Birds

The project site provides suitable foraging and nesting habitat for a variety of bird species known to occur within the region. Bird species detected during the field investigation include Say's phoebe (*Sayornis saya*), California quail (*Callipepla californica*), house sparrow (*Passer domesticus*), American crow (*Corvus brachyrhinchos*), rock pigeon (*Columbia liva*), Anna's hummingbird (*Calypte anna*), house finch (*Haemorhous mexicanus*), barn swallow (*Hirundo rustica*), California towhee (*Melozone crissalis*), northern mockingbird (*Mimus polyglottos*), lesser goldfinch (*Spinus psaltria*), Eurasian collared-dove (*Streptopelia decaocto*), western meadowlark (*Sturnella neglecta*), Cassin's kingbird (*Tyrannus vociferans*), and mourning dove (*Zenaida macroura*). These resident and migrant bird species are not special-status species, and no mitigation is required.

Mammals

The survey area provides suitable foraging and cover habitat for a variety of mammalian species known to occur within the region. Mammalian species detected during the field investigation include desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis lastrans*), and raccoon (*Procyon lotor*). Other common mammalian species that are expected to occur on-site include Botta's pocket gopher (*Thomomys bottae*), opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), and

small mammal species such as deer mouse (*Peromyscus* sp.). These mammalian species are not special-status species, and no mitigation is required.

Nesting Birds

No active nests or birds displaying nesting behavior were observed during the field survey, which was conducted during breeding season. Area K provides suitable nesting habitat for year-round and seasonal avian residents, as well as migrating songbirds that could occur in the area that area. No raptors are expected to nest on-site due to lack of suitable nesting opportunities.

Nesting birds are protected pursuant to the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (Sections 3503, 3503.5, 3511, and 3513 prohibit the take, possession, or destruction of birds, their nests or eggs). If construction occurs between February 1st and August 31st, a pre-construction clearance survey for nesting birds should be conducted within three (3) days of the start of any vegetation removal or ground disturbing activities to ensure that no nesting birds will be disturbed during construction.

Migratory Corridors and Linkages

Habitat linkages provide connections between larger habitat areas that are separated by development. Wildlife corridors are similar to linkages but provide specific opportunities for animals to disperse or migrate between areas. A corridor can be defined as a linear landscape feature of sufficient width to allow animal movement between two comparatively undisturbed habitat fragments. Adequate cover is essential for a corridor to function as a wildlife movement area. It is possible for a habitat corridor to be adequate for one species yet still inadequate for others. Wildlife corridors are features that allow for the dispersal, seasonal migration, breeding, and foraging of a variety of wildlife species. Additionally, open space can provide a buffer against both human disturbance and natural fluctuations in resources.

According to the San Bernardino County General Plan, the project site has not been identified as occurring within a Wildlife Corridor or Linkage. As designated by the San Bernardino County General Plan Open Space Element, major open space areas documented in the vicinity of the project site include the Cajon Wash, located immediately west of the project site. Further, in accordance with the City of San Bernardino's General Plan, the project site is not located within any mapped riparian corridors. However, portions of the project site are located within a City of San Bernardino General Plan mapped Biological Resources Area, which are areas that have to potential to support sensitive biological resources, but are not considered wildlife corridors or linkages.

The Cajon Wash is located immediately adjacent to the project site and is generally separated from the project site by the edge of the 100-year floodplain and the Union Pacific railroad, and a bluff area with an elevation of as much as 20 feet. The project site is not expected to provide upland movement opportunities from the Cajon Wash/Lytle Creek across the project site. However, the active mining operations to the north, and high levels of human disturbances on the project site restrict wildlife movement opportunities. Project implementation is not expected to have a significant impact to wildlife movement.

Jurisdictional Areas

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Branch regulates discharge of dredge or fill materials into "waters of the

United States" pursuant to Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the CDFW regulates alterations to streambed and bank under Fish and Wildlife Code Sections 1600 et seq., and the Regional Board regulates discharges into surface waters pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

The project site does not support any discernible drainage courses, inundated areas, wetland features, or hydric soils that would be considered jurisdictional by the Corps, Regional Board, or CDFW. A query of the NWI database found on potential blueline streams, riverine, or other aquatic resources within the project site. Therefore, project activities will not result in impacts to Corps, Regional Board, or CDFW jurisdictional areas and regulatory approvals will not be required.

Special-Status Biological Resources

The CNDDB Rarefind 5 and the CNPS Electronic Inventory of Rare and Endangered Vascular Plants of California were queried for reported locations of special-status plant and wildlife species as well as special-status natural plant communities in the San Bernardino North and Devore USGS 7.5-minute quadrangles. These two quadrangles were used due the proximity of the site to quadrangle boundaries and geographical similarities with other adjacent quadrangles. The habitat assessment evaluated the conditions of the habitat(s) within the boundaries of the project site to determine if the existing plant communities, at the time of the survey, have the potential to provide suitable habitat(s) for special-status plant and wildlife species.

The literature search identified thirty-eight (38) special-status plant species, sixty-one (61) special-status wildlife species, and three (3) special-status plant communities as having potential to occur within the San Bernardino North and Devore USGS 7.5-minute quadrangles. Special-status plant and wildlife species were evaluated for their potential to occur within the project site based on habitat requirements, availability and quality of suitable habitat, and known distributions. Species determined to have the potential to occur within the general vicinity of the project site is presented in Attachment D*: Potentially Occurring Special-Status Biological Resources*.

Special-Status Plants

According to the CNDDB and CNPS, thirty-eight (38) special-status plant species have been recorded in the San Bernardino North and Devore quadrangles (refer to Attachment D). No special-status plant species were observed on-site during the habitat assessment. Based on habitat requirements, availability and quality of habitats needed by each special-status plant species, and habitat assessment results, it was determined that the project site has a low to moderate potential to provide suitable habitat for six (6) special-status plant species: Singlewhorl burrobrush (*Ambrosia monogyra*), Parry's spineflower (*Chorizanthe parryi var. parryi*), White-bracted spineflower (*Chorizanthe xanti var. leucotheca*), slender-horned spineflower (*Dodecahema leptoceras*), Santa Ana River woollystar (*Eriastrum densifolium ssp. sanctorum*), and Mesa horkelia (*Horkelia cuneata var. puberula*). A special-status plant survey was conducted in 2021 and the results are provided below.

Focused Plant Survey Results

Based on the plant species known to occur within the general vicinity and the suitability of the on-site plant communities to support those plant species, two site visits were conducted, on May 13 and June 1, 2017.

These visits were spaced throughout the growing season to capture the appropriate phenotypic stage for proper identification of all special-status plant species determined to have a low to moderate potential to occur on the project site. Despite extensive systematic surveys of suitable habitat within the project site, none of the target special-status plant species were observed within the proposed project footprint.

Singlewhorl Burrobrush

Singlewhorl burrobrush is a species of flowering plant in the sunflower family (Asteraceae). The species is native to the southwestern United States where it grows in deserts and adjacent to mountains and dry valleys. Singlewhorl burrobrush is a thickly branching shrub and can reach heights up to four meters. Stems are thing and covered in narrow, hairy leaves and flower in large inflorescences. The staminate flowers have translucent white corollas and the fruit is dry with a single whorl of several papery wings. Singlewhorl burrobrush was not observed on-site.

Parry's Spineflower

Parry's spineflower is a species of flowering plant in the buckwheat family (Polygonaceae) found in sandy soil on flats and foothills in mixed grassland and chaparral plant communities. Parry's spineflower is known today only from scattered populations in the foothills of the San Gabriel, San Bernardino, and San Jacinto mountains of Los Angeles, San Bernardino, and Riverside counties, California. Much of the native habitat of Parry's spineflower was destroyed by development in the twentieth century. No Parry's spineflower was observed on-site.

White-bracted Spineflower

White-bracted spineflower is a species of flowering plant in the buckwheat family (Polygonaceae). It is endemic to southern California, where it is only known to occur on the eastern slopes of the San Jacinto Mountains in Riverside County and in the eastern San Bernardino Mountains in sandy to gravelly places in saltbush, pinyon-juniper, and pine-oak woodland plant communities. White-bracted spineflower is generally erect in form, reaching up to 30 centimeters in height, and reddish in color and coated in thin to dense hairs. The inflorescence is thick and woolly, with each flower surrounded by six reddish, curly-haired bracts tipped with hooked awns. The flower is up to 6 millimeters wide and pink to red in color. No white-bracted spineflower was observed on-site.

Slender-horned Spineflower

Slender-horned spineflower is a small annual plant in the buckwheat family (Polygonaceae) and has been federally and State listed as endangered since the 1980s. The species is usually found in drought prone alluvial benches subject to only rare flood events. Slender-horned spineflower is typically associated with cryptogamic crust or microhabitats that contain soil, bacteria, algae, lichens, and mosses. These crusts act as a living mulch in that they retain soil moisture and discourage the growth of annuals and weeds, as well as resist disturbances of wind and water erosion. No slender-horned spineflower were observed on-site.

Santa Ana River Woollystar

The Santa Ana River woollystar is a short-lived, perennial subshrub of the phlox family (Polemoniaceae). The entire plant is covered with woolly pubescence, giving it a silvery-white appearance. The flower is a

blue to violet-blue inflorescence. Santa Ana River woollystar is a pioneer species that colonizes washed sand deposits created by sporadic stream flow action. Between major flood events, these deposits typically exist as terraces above the high-water mark of the river and associated braided streams. Santa Ana River woollystar grows primarily in Riversidean alluvial fan sage scrub habitat in sandy soils from 1,240 to 1,900 feet above mean sea level. The Santa Ana River woollystar is both a federally and State listed endangered plant species. No Santa Ana River woollystar were observed on-site.

Mesa Horkelia

Mesa horkelia is a perennial herb in the rose family (Rosaceae). At its most distinctive, mesa horkelia is represented by historic collections from the hills and plains of Los Angeles, western Riverside, extreme southwestern San Bernardino, and northwestern San Diego counties; these populations have now largely been destroyed by urbanization. Scattered populations still exist within this core area. Occurs on sandy or gravelly soils in chaparral, woodlands, and coastal scrub plant communities at elevations ranging from 230 to 2,657 feet. No mesa horkelia was observed on-site.

Special-Status Wildlife

According to the CNDDB, sixty-one (61) special-status wildlife species have been reported in the San Bernardino North and Devore quadrangles (refer to Attachment D). San Diego black-tailed jackrabbit (*Lepus californicus bennettii*), a California "Species of Special Concern," was the only special-status species observed on the project site. A "Species of Special Concern" is an administrative designation and carries no formal legal status. Due to existing anthropogenic disturbances on-site, the observation of the San Diego black-tailed jackrabbit is assumed to be a fleeting occurrence and no mitigation is proposed. Additionally, the area west of the project site, associated with the Cajon Wash, provides high quality habitat for San Diego black-tailed jackrabbit where the animal is expected to occur, and has ample area to disperse into the Cajon Wash from the project site.

Based on habitat requirements for specific special-status wildlife species and the availability and quality of habitats needed by each species, it was determined that the project site has a moderate potential to support Cooper's hawk (*Accipiter cooperii*), San Bernardino kangaroo rat (*Dipodomys merriami parvus*), California horned lark (*Eremophila alpestris actia*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), Bell's sage sparrow (*Artemisiospiza belli belli*), coastal whiptail (*Aspidoscelis tigris stejnegeri*), Costa's hummingbird (*Calypte costae*), loggerhead shrike (*Lanius ludovicianus*), northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*), San Diego desert woodrat (*Neotoma lepida intermedia*), coast horned lizard (*Phrynosoma blainvillii*); and a low potential to support orangethroat whiptail (*Aspidoscelis hyperythra*), Los Angeles pocket mouse (*Perognathus longimembris brevinasus*), and coastal California gnatcatcher (*Polioptila californica californica*). While suitable habitat may exist, extensive surveys were completed and none of these species were observed on the project site. All remaining special-status wildlife species are absent from the project site based on habitat surveys, habitat requirements, availability and quality of habitat needed by each species, and known distributions.

Based on regional significance, the potential occurrence of California gnatcatcher, and San Bernardino kangaroo rat within the project site are described in further detail below:

California Gnatcatcher

California gnatcatcher is a federally threatened species with restricted habitat requirements, being an obligate resident of sage scrub habitats that are dominated by California sagebrush. This species generally occurs below 750 feet elevation in coastal regions and below 1,500 feet inland. According to J. Atwood and J. Bolsinger (1992), 99% of all California gnatcatcher observations are in areas with elevations below 950 feet. There are reported occurrences of California gnatcatcher at 1,600 feet elevation (500 meters).

California gnatcatcher ranges from Ventura County south to San Diego County and northern Baja California and is less common in sage scrub with a high percentage of tall shrubs. It prefers habitat with more low-growing vegetation. California gnatcatchers breed between mid-February and the end of August, with peak activity from mid-March to mid-May. Population estimates indicate that there are approximately 1,600 to 2,290 pairs of coastal California gnatcatcher remaining. Declines are attributed to loss of sage scrub habitat due to development, as well as cowbird nest parasitism.

California gnatcatcher are ground and shrub-foraging insectivores. They feed on small insects and other arthropods. A California gnatcatcher's territory is highly variable in size and seems to be correlated with distance from the coast, ranging from less than 1 ha to over 9 ha. In a 1998 study, biologist Patrick Mock concluded that California gnatcatcher in the inland region require a larger territory than those on the coast in order to meet the nutritional requirements needed for survival and breeding.

The Primary Constituent Elements (PCEs)[3] essential to support the biological needs of foraging, reproducing, rearing of young, intra-specific communication, dispersal, genetic exchange, or sheltering for California gnatcatcher that were surveyed for include:

1. Dynamic and Successional sage scrub Habitats and Associated Vegetation (Diegan Coastal Sage Scrub, Coastal Sage-Chaparral Scrub, etc.) that provide space for individual and population growth, normal behavior, breeding, reproduction, nesting, dispersal and foraging; and
2. Non-sage scrub habitats such as chaparral, grassland, and riparian areas, in proximity to sage scrub habitats have the potential to provide linkages to help with dispersal, foraging and nesting.

The project site ranges in elevation from 1,550 to 1,650 feet above mean sea level, which is outside the known elevational range of California gnatcatcher. Ninety-nine percent of all California gnatcatcher observations occur below 950 feet above msl. California gnatcatcher's preferred habitat is coastal sage scrub dominated by California sage brush. Portions of the project site support a RAFSS plant community that is not the preferred habitat for California gnatcatcher. In addition, the site is isolated from California gnatcatcher occupied coastal sage scrub habitats and linkage areas in the region by surrounding development and mining activities. The site is presumed to be unoccupied and focused surveys are not recommended.

San Bernardino Kangaroo Rat

The San Bernardino kangaroo rat, federally listed as endangered, is one of several kangaroo rat species in

3 Specific elements of physical and biological features that provide for a species' life-history process and are essential to the conservation of the species.

its range. The Dulzura (*Dipodomys simulans*), the Pacific kangaroo rat (*Dipodomys agilis*) and the Stephens kangaroo rat (*Dipodomys stephensi*) occur in areas occupied by the San Bernardino kangaroo rat, but these other species have a wider habitat range. San Bernardino kangaroo rat historically ranged from the San Bernardino Valley in San Bernardino County to southwest Perris, Bautista Canyon, and Murrieta Hot Springs in Riverside County, with at least 25 separate localities identified. Currently, populations of the San Bernardino kangaroo rat are limited to seven widely separated locations in San Bernardino and Riverside Counties, four of which (City Creek, Etiwanda, Reche Canyon, and South Bloomington) support only small, remnant populations. The Santa Ana River, Lytle and Cajon washes, and the San Jacinto River support the largest extant concentrations of San Bernardino kangaroo rat and the largest areas of habitat for this species (approximately 3,200 acres total). The total area of occupied habitat occurs across a mosaic of approximately 13,697 acres of potential habitat; however, all but the 3,215 occupied areas are currently more mature than the open, early successional habitat types preferred by the San Bernardino kangaroo rat (USFWS 2009).

San Bernardino kangaroo rat is found primarily on sandy and loamy sand substrates, where they can readily excavate simple, shallow burrows. This is typically associated with Riversidean Alluvial Fan Sage Scrub (RAFSS) habitat, a relatively uncommon desert-influenced plant community in southern California that develops on alluvial fans and floodplains subjected to scouring and deposition (USFWS 2009). Adjacent upland habitat provide refuge for San Bernardino kangaroo rat during flood events. Animals occupying this refugia habitat are able to repopulate core habitat areas within the floodplain following major flood events. Most of the drainages have been historically altered as a result of flood control efforts and the resulting increased use of river resources, including mining, off-road vehicle use, and road and housing development. This increased use of river resources has resulted in a reduction in both the amount and quality of habitat available for the San Bernardino kangaroo rat. The past habitat losses and potential future losses prompted the emergency listing of the San Bernardino kangaroo rat as an endangered species (USFWS, 1998a).

San Bernardino kangaroo rat is known to occur within Lytle Creek. The project site consists of vacant, heavily disturbed land with compacted soils that have been disturbed from previous land uses. Field sign for kangaroo rat, including San Bernardino kangaroo rat, is distinctive and readily noted in the field. No sign (e.g., San Bernardino kangaroo rat characteristic burrows, dusting baths, and/or tail drags) were observed on the project site. Additionally, the project site is separated from Lytle Creek by existing developments.

A San Bernardino kangaroo rat trapping study was conducted from May 11 to May 15, 2021. After a total of 1,000 trap nights, no San Bernardino kangaroo rat were caught during the trapping surveys. No other sensitive mammal species were trapped. A San Bernardino kangaroo rat trapping study was prepared under separate cover.

No San Bernardino kangaroo rats were trapped, nor were any other sensitive species captured. Direct impact to these species from project implementation is not expected.

Special-Status Plant Communities

According to the CNDDB, three (3) special-status plant communities have been reported in the San Bernardino North and Devore USGS 7.5-minute quadrangles: Riversidean Alluvial Fan Sage Scrub

(RAFSS), Southern Riparian Forest, and Southern Sycamore Alder Riparian Woodland.

RAFSS habitat was the only sensitive habitat observed on the project site during the habitat assessment. However, as noted above, the isolated and senescing RAFSS habitats identified on the project site has either succeeded to upland chaparral habitat or is no longer functioning as viable RAFSS habitat with long-term conservation value. More specifically, the RAFSS has been extensively disturbed by human activity for decades, and is fragmented by roads, trails, and development. The project site is surrounded by existing developments and mining activities. The RAFSS habitat within the proposed project footprint is not occupied by any listed or otherwise special-status plant or wildlife species, indicating minimal or no value as biological habitat. Therefore, the loss of the disturbed, fragmented, low-quality RAFSS on the project site is not considered a significant impact and would not require specific mitigation.

Critical Habitats

Under the federal Endangered Species Act, "Critical Habitat" is designated at the time of listing of a species or within one year of listing. Critical Habitat refers to specific areas within the geographical range of a species at the time it is listed that include the physical or biological features that are essential to the survival and eventual recovery of that species. Maintenance of these physical and biological features requires special management considerations or protection, regardless of whether individuals or the species are present or not. All federal agencies are required to consult with the USFWS regarding activities they authorize, fund, or permit which may affect a federally listed species or its designated Critical Habitat. The purpose of the consultation is to ensure that projects will not jeopardize the continued existence of the listed species or adversely modify or destroy its designated Critical Habitat. The designation of Critical Habitat does not affect private landowners, unless a project they are proposing is on federal lands, uses federal funds, or requires federal authorization or permits (e.g., funding from the Federal Highways Administration or a Clean Water Act Permit from the United States Army Corps of Engineers). If a there is a federal nexus, then the federal agency that is responsible for providing the funding or permit would consult with the USFWS.

Area K is not located within federally designated Critical Habitat. However, the majority of Area N is located within designated Critical Habitat for San Bernardino kangaroo rat (refer to Exhibit 5, *Critical Habitat*, in Attachment B). Therefore, no impacts to federally designated Critical Habitat will occur from implementation of the proposed project. It is important to note, however, that no San Bernardino kangaroo rat were observed or trapped during extensive trapping surveys, discussed above. Since there is no federal nexus, and no San Bernardino kangaroo rat were captured on the project site, the applicant will not be required to initiate a Section 7 Consultation for the loss of Critical Habitat.

Conclusion

The project site consists of both developed (mining areas) and undeveloped land that has been subject to a variety of human-related disturbances from existing mining activities and surrounding development. Four (4) plant communities were observed within the boundaries of Area K site during the habitat assessment: highly disturbed Riversidean alluvial fan sage scrub (RAFSS), buckwheat scrub, non-native grassland, and ornamental. However, as noted above, the isolated and senescing RAFSS habitats identified on the project site has either succeeded to upland chaparral habitat or is no longer functioning as viable RAFSS habitat with long-term conservation value. Due to the isolation of the site and the removal of all hydrologic

influences of the Cajon Wash, Area K no longer supports viable RAFSS habitat, and no mitigation is required. Area N has no plant communities or biological resources within the assessed area, as soils within Area N have been heavily disturbed from ongoing and historical mining activities.

Based on the proposed project footprint and existing site conditions discussed in this report, no special status plant or wildlife species inhabit the project site, and none of the special-status plant or wildlife species known to occur in the general vicinity of the project site will be directly or indirectly impacted from implementation of the proposed project. With completion of the recommendations provided below, no impacts to year-round, seasonal, or special-status avian residents or special-status species will occur from implementation of the proposed project. Therefore, it was determined that implementation of the project will have "no effect" on federally or State listed species known to occur in the general vicinity of the project site. Additionally, the development of the project will not impact federally designated Critical Habitats, since there is no federal nexus and no federally listed species were documented onsite, or regional wildlife movement corridors/linkages.

Recommendations

Migratory Bird Treaty Act and Fish and Game Code

Nesting birds are protected pursuant to the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (Sections 3503, 3503.5, 3511, and 3513 prohibit the take, possession, or destruction of birds, their nests or eggs). In order to protect migratory bird species, a nesting bird clearance survey should be conducted prior to any ground disturbance or vegetation removal activities that may disrupt the birds during the nesting season.

If construction occurs between February 1st and August 31st, a pre-construction clearance survey for nesting birds should be conducted within three (3) days of the start of any vegetation removal or ground disturbing activities to ensure that no nesting birds will be disturbed during construction. The biologist conducting the clearance survey should document a negative survey with a brief letter report indicating that no impacts to active avian nests will occur. If an active avian nest is discovered during the pre-construction clearance survey, construction activities should stay outside of a no-disturbance buffer. The size of the no-disturbance buffer will be determined by the wildlife biologist and will depend on the level of noise and/or surrounding anthropogenic disturbances, line of sight between the nest and the construction activity, type and duration of construction activity, ambient noise, species habituation, and topographical barriers. These factors will be evaluated on a case-by-case basis when developing buffer distances. Limits of construction to avoid an active nest will be established in the field with flagging, fencing, or other appropriate barriers; and construction personnel will be instructed on the sensitivity of nest areas. A biological monitor should be present to delineate the boundaries of the buffer area and to monitor the active nest to ensure that nesting behavior is not adversely affected by the construction activity. Once the young have fledged and left the nest, or the nest otherwise becomes inactive under natural conditions, construction activities within the buffer area can occur.

Please do not hesitate to contact Tom McGill at (951) 285-6014 or tmcgill@elmtconsulting.com or Travis McGill at (909) 816-1646 or travismcgill@elmtconsulting.com should you have any questions this report.

Sincerely,

Thomas J. McGill, Ph.D.
Managing Director

Travis J. McGill
Director

Attachments:

A. *Site Plan*
B. *Project Exhibits*
C. *Site Photographs*
D. *Potentially Occurring Special-Status Biological Resources*
E. *Regulations*

Attachment A

Site Plans



INDEX MAP

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
CA MINE ID # 91-36-0188
MINING / RECLAMATION PLAN

PROPOSED USE:	EXISTING, PERMITTED AGGREGATE MINE, AGGREGATE PROCESSING FACILITIES, AND HOT MIX ASPHALT PLANT
MINERAL COMMODITY:	SAND AND GRAVEL
APPLICANT / OPERATOR:	VULCAN MATERIALS COMPANY - WESTERN DIVISION 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766 (818) 553-8800
PLAN DESIGN:	SESPE CONSULTING, INC. 374 POLI STREET, SUITE 200 VENTURA, CALIFORNIA 93001 (805) 275-1515
LEAD AGENCY:	COUNTY OF SAN BERNARDINO LAND USE SERVICES DEPARTMENT 385 N. ARROWHEAD ROAD SAN BERNARDINO, CALIFORNIA 93001 (909) 387-4002
LAND USE ZONING:	SEE SHEET 2
BASE MAP SOURCES:	SEE TOPOGRAPHY SOURCES (RIGHT)

SURROUNDING LAND USES

DIRECTION	LAND USE DESIGNATION	DESCRIPTION
NORTH	UNDEVELOPED LAND & INDUSTRIAL DEVELOPMENT	UNDEVELOPED LAND / A LARGE INDUSTRIAL WAREHOUSE OCCURS NORTH OF THE PROJECT SITE AND LIGHT INDUSTRIAL DEVELOPMENT TO THE NORTHEAST.
SOUTH	MUSCOY / SINGLE RESIDENTIAL - 1-ACRE MINIMUM (MS/RS-1)	THE DEVIL CREEK DIVERSION CHANNEL RUNS DOWN THE SOUTHERN BOUNDARY OF THE SITE, AND THE RESIDENTIAL COMMUNITY OF MUSCOY IS LOCATED DIRECTLY SOUTH OF THIS DIVERSION CHANNEL.
EAST	INDUSTRIAL HEAVY (IH)	INDUSTRIAL DEVELOPMENTS ARE LOCATED EAST OF THE SITE, ACROSS CAJON BOULEVARD.
WEST	UNDEVELOPED LAND	THE LYTLE CREEK/CAJON CREEK DRAINAGE LOCATED TO THE WEST.

SHEET INDEX

FIGURE 1: SITE OVERVIEW - EXISTING CONDITIONS
FIGURE 2: PROPERTY INFORMATION
FIGURE 3: MINING PLAN
FIGURE 4: RECLAMATION PLAN
FIGURE 5: SECTION A-A'
FIGURE 6: SECTION B-B'
FIGURE 7: SITE PLAN

DATA SOURCES

PROPERTY BOUNDARIES:

ALTA SURVEY PREPARED APRIL 2006 BY DAWSON SURVEYING, INC.

ALTA SURVEY PREPARED JUNE 2008 BY GORDON EDWARDS, PLS #6678 FOR THE LOT LINE ADJUSTMENT FOR FOR APN 0262-241-26.

SURVEY DATA PREPARED SEPTEMBER 2019 BY JOSEPH PADILLA, PLS #7557 FOR THE LOT LINE ADJUSTMENT OF APN: 0262-221-17.

TOPOGRAPHY:

TOPOGRAPHY WITHIN AREAS K, L, M, AND N SOURCED FROM DIGITAL MAPPING, INC. (DENNIS HERBERT DILLMAN, PLS 5424), FLOWN 05/12/2014.

TOPOGRAPHY OUTSIDE AREAS K, L, M, AND N SOURCED FROM DIGITAL MAPPING, INC., FLOWN 8/30/2005.

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88

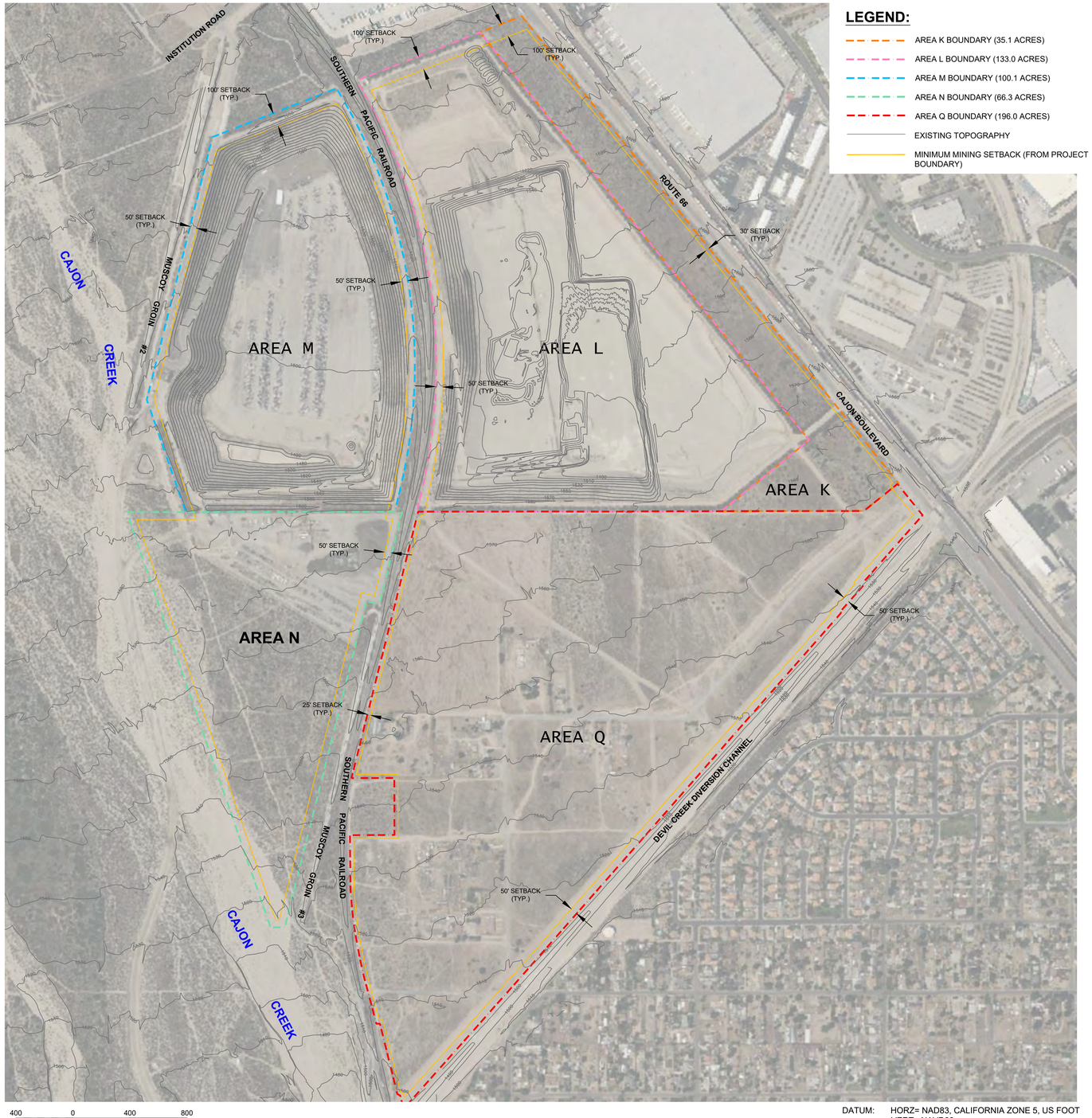
CONTOUR INTERVAL: 10 FEET

AERIAL:

BING IMAGERY, 2022

PROJECT SITE INFORMATION

EASEMENT:	PUBLIC UTILITIES EASEMENTS TO BE VACATED PRIOR TO MINING WITHIN THESE AREAS
MINERAL BEING EXTRACTED:	SAND AND GRAVEL
ADJACENT AREA:	SEE SHEET 3
PROJECT AREA:	SEE SHEET 3
PROTECTED PLANTS:	NONE
GROUNDWATER LEVEL:	+260 FEET BELOW GROUND SURFACE (SEE SHEET 5 AND 6)
EXISTING LAND USE DESIGNATION:	SEE TABLE SHEET 2
PROPOSED LAND USE DESIGNATION:	SEE TABLE SHEET 2
ELECTRICITY:	SOUTHERN CALIFORNIA EDISON (SCE) P.O. BOX 800 ROSEMEAD, CA 91770 (800) 655-4555
GAS:	N/A (NO NATURAL GAS AND/OR PROPANE SERVICE REQUIRED)
WATER:	EXISTING WATER WELL LOCATED WITHIN AREA M
SEWER:	EXISTING PORTABLE SANITATION FACILITIES LOCATED WITHIN AREA L
TELEPHONE:	N/A (NO FIXED LANDLINE TELEPHONE SERVICE REQUIRED)



Vulcan Materials Company

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(805) 275-1515 • www.sespeconsulting.com

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VULCAN MATERIALS COMPANY -
WESTERN DIVISION
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LAND USE CONSULTANT
SESPE CONSULTING, INC.
374 POLI STREET, SUITE 200
VENTURA, CALIFORNIA 93001
(805) 275-1515

REVISIONS

MARK	DATE	DESCRIPTION	BY
	12/20/22	INITIAL DRAFT	GJC

REVIEWED BY: DATE DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

SITE OVERVIEW - EXISTING CONDITIONS

SCALE: HORIZ. AS SHOWN VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER 1

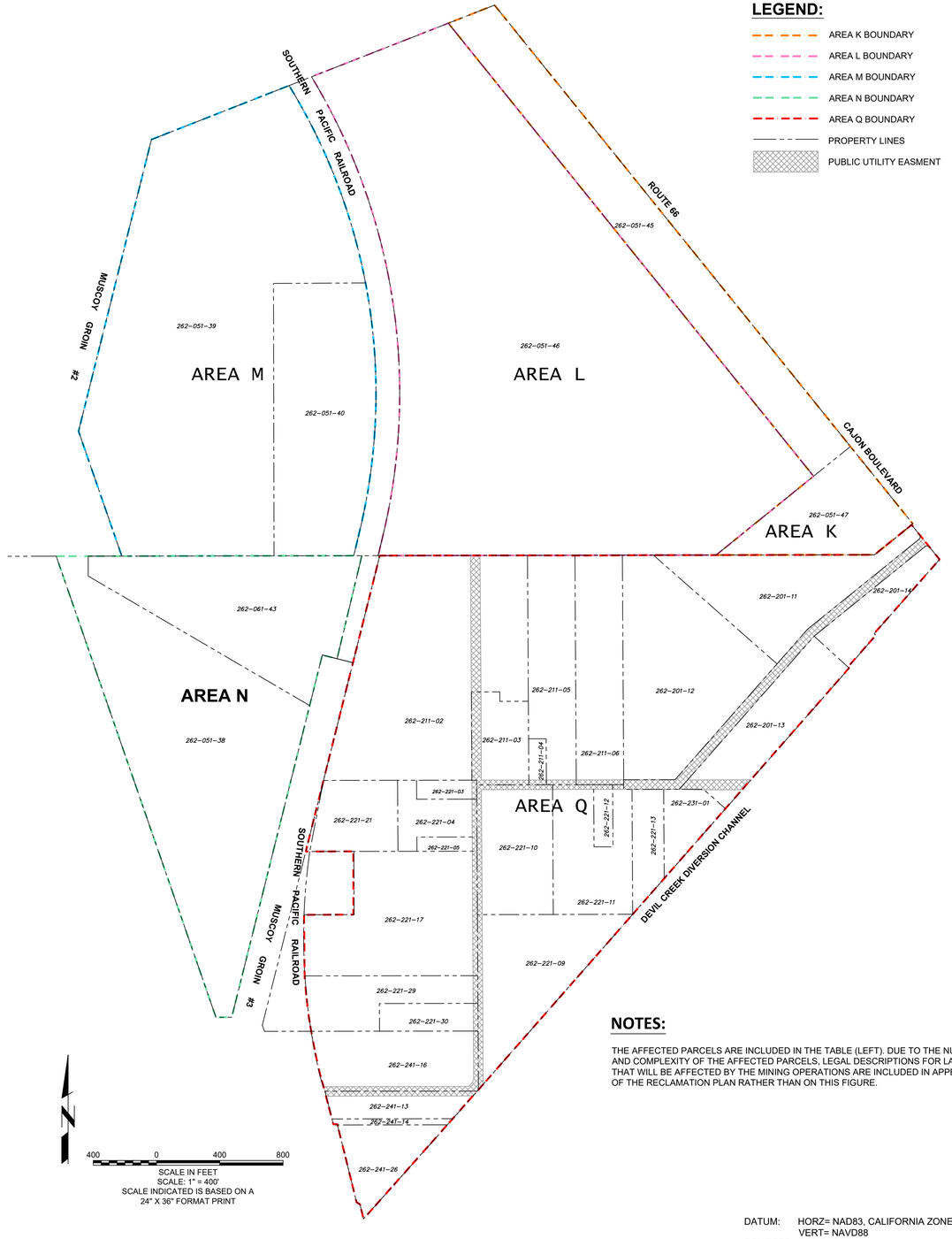


INDEX MAP

PROPERTY INFORMATION

PLANNING AREA	PARCEL NUMBER	AREA (ACRES)	PROPERTY OWNER	LAND USE DESIGNATION	CURRENT MINERAL RIGHTS INTEREST HOLDER
AREA Q	0262-201-11-0000	12.45	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-201-12-0000	20.15	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-201-13-0000	8.21	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-201-14-0000	4.16	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-02-0000	32.60	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-03-0000	4.60	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-04-0000	0.75	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-05-0000	9.26	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-211-06-0000	10.00	ARUNDEL COMPANY, LLC 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	ARUNDEL COMPANY, LLC P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-03-0000	1.05	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-04-0000	3.30	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-05-0000	0.79	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-09-0000	12.50	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-10-0000	9.04	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-11-0000	8.40	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-12-0000	1.10	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-13-0000	3.11	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-17-0000	16.89	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-21-0000	5.32	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-29-0000	6.03	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-221-30-0000	2.38	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014

PLANNING AREA	PARCEL NUMBER	AREA (ACRES)	PROPERTY OWNER	LAND USE DESIGNATION	CURRENT MINERAL RIGHTS INTEREST HOLDER
AREA Q	0262-231-01-0000	2.90	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-241-13-0000	3.56	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-241-14-0000	0.60	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-241-16-0000	8.74	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA Q	0262-241-26-0000	4.85	VULCAN LANDS, INC. 1200 URBAN CENTER DRIVE BIRMINGHAM, ALABAMA 35242	GENERAL INDUSTRIAL (GI) COMMUNITY INDUSTRIAL (CI)	VULCAN LANDS, INC. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA N	0262-051-38-0000	177.08	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA M	0262-051-39-0000	77.38	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA M	0262-051-40-0000	22.72	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA K	0262-051-45-0000	24.79	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	LIGHT INDUSTRIAL (IL) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA L	0262-051-46-0000	132.35	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA K	0262-051-47-0000	11.28	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014
AREA N	0262-061-43-0000	21.23	CALMAT CO. 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766	INDUSTRIAL EXTRACTIVE (IE) CALMAT/CAJON CREEK SPECIFIC PLAN (SP 90-10)	CALMAT CO. P.O. BOX 385014 BIRMINGHAM, AL 35242-5014



NOTES:

THE AFFECTED PARCELS ARE INCLUDED IN THE TABLE (LEFT). DUE TO THE NUMBER AND COMPLEXITY OF THE AFFECTED PARCELS, LEGAL DESCRIPTIONS FOR LANDS THAT WILL BE AFFECTED BY THE MINING OPERATIONS ARE INCLUDED IN APPENDIX E OF THE RECLAMATION PLAN RATHER THAN ON THIS FIGURE.

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88
SOURCES: SEE SHEET 1

Vulcan Materials Company

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POMONA, CALIFORNIA 91766

LAND USE CONSULTANT
SESPE CONSULTING, INC.
374 POLI STREET, SUITE 200
VENTURA, CALIFORNIA 93001
(805) 275-1515

REVISIONS

MARK	DATE	DESCRIPTION	BY
	06/12/22	INITIAL DRAFT	GJC

REVIEWED BY:
DATE
DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

PROPERTY INFORMATION

SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER
2

Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\CAD\Consolidated Mine & Rec Plan\Vulcan–CajonCreek–ConsolidatedMP–v1.0.dwg Jun 12, 2023, 7:54pm Pearce.Swerdfeger



INDEX MAP

GEOLOGIC DESCRIPTION:

THE GEOLOGIC DESCRIPTION IS BASED ON THE FOLLOWING TECHNICAL REPORTS AND HAS NOT BEEN VERIFIED IN THE FIELD BY THE UNDERSIGNED:

- DANSKIN, W., MCPHERSON, K., & WOOLFENDEN, L. (2006). *HYDROLOGY, DESCRIPTION OF COMPUTER MODELS, AND EVALUATION OF SELECTED WATER-MANAGEMENT ALTERNATIVES IN THE SAN BERNARDINO AREA, CALIFORNIA*. U.S. GEOLOGICAL SURVEY. U.S. GEOLOGICAL SURVEY.
- DUTCHER, L., & GARRETT, A. (1963). GEOLOGIC AND HYDROLOGIC FEATURES OF THE SAN BERNARDINO AREA, CALIFORNIA. WASHINGTON, D.C.: US GOVERNMENT PRINTING OFFICE.
- HALEY & ALDRICH, INC. (APRIL 2020). *ADDENDUM TO GEOTECHNICAL EVALUATION REPORT*. WALNUT CREEK, CA: HALEY & ALDRICH, INC.
- MILLER, F., & MATTI, J. (2001). GEOLOGIC MAP OF THE SAN BERNARDINO NORTH 7.5' QUADRANGLE, SAN BERNARDINO COUNTY , CALIFORNIA. *OPEN-FILE REPORT 01-131*. MENLO PARK, CA, SAN BERNARDINO: U.S. GEOLOGICAL SURVEY. RETRIEVED FROM HTTPS://PUBS.USGS.GOV/OF/2001/0131/.

GEOLOGIC SETTING

THE SITE IS LOCATED WITHIN THE PENINSULAR RANGES PHYSIOGRAPHIC PROVINCE, WHICH CONSISTS OF A SERIES OF MOUNTAINS RANGES DOMINATED BY MESOZOIC GRANITIC AND OLDER METAMORPHIC ROCKS SEPARATED BY VALLEY BASINS FORMED BY SAN ANDREAS-RELATED FAULTS AND OTHER FAULT SEGMENTS. THE SITE IS SITUATED WITHIN THE SAN BERNADINO BASIN, AN ALLUVIAL LOWLAND FILLED WITH SEDIMENT DERIVED FROM SURROUNDING HIGHLANDS THAT IS BOUND BY THE SAN ANDREAS FAULT ZONE TO THE NORTH AND THE SAN JACINTO FAULT TO THE SOUTHWEST. THE SAN BERNADINO BASIN REPRESENTS A PULL-APART BASIN THAT FORMED IN RESPONSE TO A RIGHT STEP DISPLACEMENT BETWEEN THE SAN JACINTO AND SAN ANDREAS FAULTS (HALEY & ALDRICH, 2020).

REGIONAL GEOLOGY

THE SITE IS SITUATED SOUTH OF THE EASTERN EXTENT OF THE SAN GABRIEL MOUNTAINS, A PROMINENT PHYSIOGRAPHIC FEATURE ALONG THE NORTHERN EDGE OF THE LOS ANGELES METROPOLITAN AREA AND PORTIONS OF THE INLAND EMPIRE. THE REGIONAL GEOLOGY CONSISTS OF SEDIMENTARY BASIN INFILL CHARACTERIZED AS UNCONSOLIDATED RIVER-CHANNEL DEPOSITS AND HOLOCENE AND PLEISTOCENE ALLUVIUM (DANSKIN, ET AL., 2006). THE EASTERN REGION IS CHARACTERIZED BY YOUNGER ALLUVIUM, AND QUATERNARY AND TERTIARY INDURATED SEDIMENTARY STRATA OUTCROPPING ALONG LOW-RELIEF HILLSIDES. A BASEMENT COMPLEX OF PRECAMBRIAN TO TERTIARY IGNEOUS AND METAMORPHIC ROCKS THAT UNDERLIES THE BASIN INFILL CROPS OUT IN THE SURROUNDING MOUNTAIN RANGES (DUTCHER & GARRETT, 1963). REGIONALLY, THE AREA IS CONSIDERED SEISMICALLY ACTIVE, WITH MANY FAULTS DESIGNATED AS BEING IN ALQUIST-PRIOLO (AP) SPECIAL STUDY ZONES. THE REGIONAL STRUCTURAL GEOLOGY IS CHARACTERIZED BY THE CUCAMONGA THRUST FAULT AND THE SAN ANDREAS FAULT, WHICH BOUND THE SAN GABRIEL MOUNTAINS TO THE SOUTH AND NORTHEAST, RESPECTIVELY. THE SAN JACINTO FAULT TRENDS BETWEEN THE CUCAMONGA THRUST FAULT AND THE SAN ANDREAS FAULT THROUGH LYTLE AND GLEN HELEN WASHES AND CANYONS.

SITE GEOLOGY

THE GEOLOGY OF THE SITE IS CHARACTERIZED AS BRAIDED, ALLUVIAL LITHOFACIES THAT FORM WITHIN MEDIAL TO DISTAL FAN COMPLEXES. BASED ON THE USGS GEOLOGIC MAP OF THE SAN BERNADINO NORTH 7.5-MINUTE QUADRANGLE, SAN BERNADINO COUNTY, CALIFORNIA (MILLER & MATTI, 2001), THREE DISTINCT ALLUVIAL LITHOFACIES ARE MAPPED AT THE SITE. THE NORTHEASTERN PORTION OF THE SITE IS CHARACTERIZED BY LATE HOLOCENE SAND AND GRAVEL DEPOSITS DISTINGUISHED AS UPPER-TERRACE LEVEL SEDIMENTARY DEPOSITS. THE LITHOFACIES OCCURRING IN THE CENTRAL SECTION OF THE SITE, AS WELL AS THE NORTHEASTERN PORTION, IS SLIGHTLY CONSOLIDATED TO CEMENTED HOLOCENE AND LATE PLEISTOCENE SILT, SAND, AND PEBBLE DEPOSITS. IN THE SOUTHWEST CORNER OF AREA Q, LATE HOLOCENE, LOWER TERRACE DEPOSITS OCCUR THAT CONSIST OF SAND AND GRAVEL WITH SPARSE PEBBLE TO BOULDER SIZE CLASTS. THESE DEPOSITS ARE TYPICALLY THIN (< 10 FT THICK) AND LATERALLY DISCONTINUOUS DUE TO LOCALIZED EROSION AND SCOURING. REGARDING STRUCTURAL GEOLOGY, THERE ARE THREE MAJOR FAULTS NEAR THE SITE: THE GLEN HELEN FAULT STRAND OF THE SAN JACINTO FAULT, THE CUCAMONGA THRUST FAULT, AND THE SAN ANDREAS FAULT (HALEY & ALDRICH, 2022). A PORTION OF THE GLEN HELEN FAULT STRAND, LIKELY THE MOST ACTIVE FAULT OF THE SAN JACINTO FAULT, IS MAPPED AS A "CONCEALED" FAULT TRENDING THROUGH THE SOUTHWEST PORTION OF AREA Q. THIS FAULT SEGMENT IS LISTED AS A STATE OF CALIFORNIA AP EARTHQUAKE FAULT ZONE.

GENERAL NOTES:

TERMINATION DATES

MINING:	2088
RECLAMATION:	2090
MONITORING:	2093

DESIGN INFORMATION

MINING DEPTH:	240 FEET BELOW GROUND SURFACE (BGS)
SLOPES:	2H:1V (HORIZONTAL TO VERTICAL)

STRUCTURES

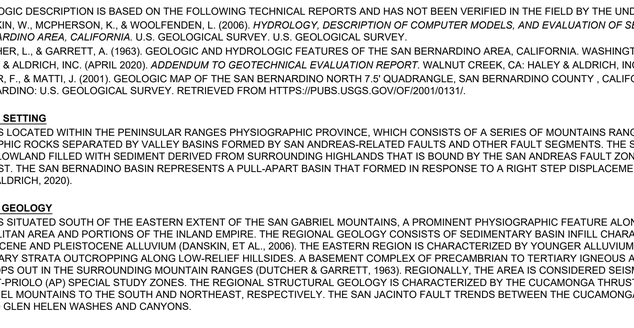
ADJACENT AREA: NO OFF-SITE ADJACENT STRUCTURES WITHIN 200 FEET OF SITE BOUNDARIES

PROJECT AREA: EXISTING AND PROPOSED STRUCTURES ARE IDENTIFIED ON SHEET 6, AND INCLUDE (BUT ARE NOT LIMITED TO): AGGREGATE PROCESSING PLANT, HOT MIX ASPHALT PLANT, RECYCLE PLANT, CONVEYORS, ANCILLARY SUPPORT FACILITIES. NO PERMANENT STRUCTURES PROPOSED, ALL STRUCTURES ARE TEMPORARY AND WILL BE REMOVED DURING RECLAMATION.

NO SIGNAGE PROPOSED.

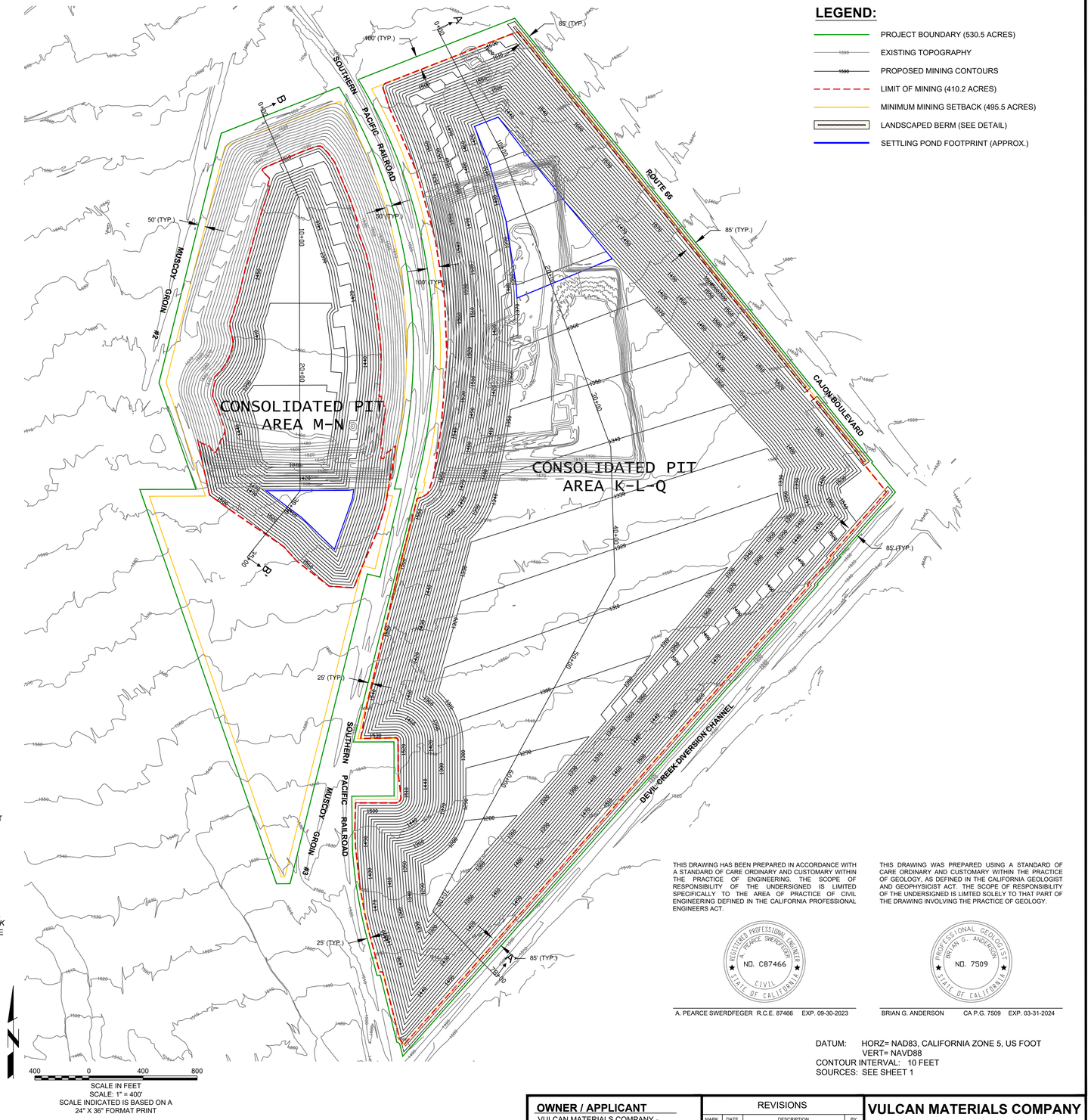
MINING NOTES:

1. MINING MAY BE CONDUCTED IN MULTIPLE AREAS THROUGHOUT THE SITE AT ONE TIME TO ALLOW THE OPERATOR TO BLEND MATERIALS FROM MULTIPLE AREAS TO MEET PRODUCT SPECIFICATIONS. THEREFORE, MINING IN THE VARIOUS EXTRACTION AREAS THROUGHOUT THE SITE IS CONSIDERED A SINGLE PHASE.
2. MOST OF THE TOPSOIL AND SUBSOIL HAVE ALREADY BEEN REMOVED FROM THE MINING AREAS. THIS MATERIAL WILL BE STORED IN PERIMETER BERMS IN AREA K AND Q, AS SHOWN. ANY ADDITIONAL MATERIAL RECOVERED DURING OPERATIONS WILL BE STORED FOR USE IN RECLAMATION.
3. MINING SETBACKS WILL BE MAINTAINED AS SHOWN HEREON.
4. THE OPERATOR WILL COMPLY WITH THE CONCLUSIONS PRESENTED BY HALEY & ALDRICH, INC. IN THE *GEOTECHNICAL EVALUATION FOR VULCAN MATERIALS COMPANY CAJON CREEK CONSOLIDATION PROJECT* (REPORT DATE: OCTOBER 10, 2022). FINAL PIT SLOPES SHALL BE INCLINED NO STEEPER THAN 2H:1V.
5. BEST MANAGEMENT PRACTICES (BMPs) TO PREVENT EROSION, SEDIMENT, AND WINDBLOWN DUST WILL BE IMPLEMENTED AS DESCRIBED IN THE SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP).
6. APPROXIMATE ANTICIPATED LOCATION OF FINES SETTLING BASINS ARE SHOWN HEREON FOR ILLUSTRATIVE PURPOSES AND ARE SUBJECT TO CHANGE IN VOLUME, LOCATION, AND FOOTPRINT BASED ON OPERATIONAL NEEDS OVER THE LIFE OF THE MINE.



BERM DETAIL

N.T.S.
DETAIL FOR PERIMETER BERM IN AREA K AND Q



LEGEND:

- PROJECT BOUNDARY (530.5 ACRES)
- EXISTING TOPOGRAPHY
- PROPOSED MINING CONTOURS
- LIMIT OF MINING (410.2 ACRES)
- MINIMUM MINING SETBACK (495.5 ACRES)
- LANDSCAPED BERM (SEE DETAIL)
- SETTLING POND FOOTPRINT (APPROX.)

THIS DRAWING HAS BEEN PREPARED IN ACCORDANCE WITH A STANDARD OF CARE ORDINARY AND CUSTOMARY WITHIN THE PRACTICE OF ENGINEERING. THE SCOPE OF RESPONSIBILITY OF THE UNDERSIGNED IS LIMITED SPECIFICALLY TO THE AREA OF PRACTICE OF CIVIL ENGINEERING DEFINED IN THE CALIFORNIA PROFESSIONAL ENGINEERS ACT.

REGISTERED PROFESSIONAL ENGINEER — A. PEARCE SWERDFEGER — No. C87466 — CIVIL — STATE OF CALIFORNIA

A. PEARCE SWERDFEGER R.C.E. 87466 EXP. 09-30-2023

THIS DRAWING WAS PREPARED USING A STANDARD OF CARE ORDINARY AND CUSTOMARY WITHIN THE PRACTICE OF GEOLOGY, AS DEFINED IN THE CALIFORNIA GEOLOGIST AND GEOPHYSICIST ACT. THE SCOPE OF RESPONSIBILITY OF THE UNDERSIGNED IS LIMITED SOLELY TO THAT PART OF THE DRAWING INVOLVING THE PRACTICE OF GEOLOGY.

PROFESSIONAL GEOLOGIST — BRIAN G. ANDERSON — No. 7509 — STATE OF CALIFORNIA

BRIAN G. ANDERSON CA P.G. 7509 EXP. 03-31-2024

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88
CONTOUR INTERVAL: 10 FEET
SOURCES: SEE SHEET 1

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	12/20/22	INITIAL DRAFT	GJC

REVIEWED BY: _____ DATE _____ DATE _____

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

MINING PLAN

SCALE: HORZ. AS SHOWN VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER 3

Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\CAD\Consolidated Mine & Rec Plan\Vulcan–CajonCreek–ConsolidatedMP–v1.0.dwg Jun 12, 2023, 4:01pm Pearce.Swerdfeger



INDEX MAP

RECLAMATION NOTES:

1. TOPSOIL AND SUBSOIL STORED IN PERIMETER BERMS OR ELSEWHERE WILL BE DECONSTRUCTED AND TOPSOIL/SUBSOIL WILL BE SPREAD THROUGHOUT THE AREA TO BE RECLAIMED TO AID IN RE-ESTABLISHMENT OF THE TOPSOIL PROFILE.
2. THE OPERATOR WILL COMPLY WITH THE CONCLUSIONS PRESENTED BY HALEY & ALDRICH, INC. IN THE *GEOTECHNICAL EVALUATION FOR VULCAN MATERIALS COMPANY CAJON CREEK CONSOLIDATION PROJECT* (REPORT DATE: OCTOBER 10, 2022). FINAL PIT SLOPES SHALL BE INCLINED NO STEEPER THAN 2H:1V.
3. AT THE COMPLETION OF MINING, ALL DISTURBED AREAS AT THE SITE WILL BE REVEGETATED AS DESCRIBED IN SECTION 5.6 OF THE RECLAMATION PLAN TEXT.
4. RECLAMATION OF THE SITE WILL INCLUDE SITE CLEANUP, PUBLIC SAFETY MEASURES, DRAINAGE CONTROLS, RECONTOURING, AND RIPPING (WHERE APPLICABLE), AND REVEGETATION UTILIZING NATIVE SPECIES, MONITORING, AND MAINTENANCE.
5. THE TIMEFRAMES SHOWN IN THE "RECLAMATION TIMELINE" TABLE BELOW ARE ESTIMATIONS AND MAY CHANGE DEPENDING ON MARKET DEMANDS OR UNFORESEEN CIRCUMSTANCES.
6. ONCE MINING IS COMPLETE, ALL AREAS WILL BE RECLAIMED TO OPEN SPACE.
7. REVEGETATION ACTIVITIES WILL BE MONITORED BY A QUALIFIED REVEGETATION SPECIALIST. CHANGES TO THE REVEGETATION METHODS AND DEVELOPMENT OF POSSIBLE ALTERNATIVES TO ACHIEVE SMARA MINIMUM REVEGETATION STANDARDS WILL BE REVIEWED IN COORDINATION WITH SAN BERNARDINO COUNTY.
8. REVEGETATION WILL NOT PRECLUDE ACCESSES TO, OR MINING OF ANY AGGREGATE RESERVES REMAINING AFTER COMPLETION OF THE PROPOSED MINING ACTIVITIES.
9. OFFICIALS OF VULCAN MATERIALS COMPANY WILL BE RESPONSIBLE FOR ACCOMPLISHING THE MAINTENANCE AND MONITORING PROGRAM IN COORDINATION WITH THE SAN BERNARDINO PLANNING DEPARTMENT.
10. DURING RECLAMATION, WATER IN THE SETTLING PONDS WILL BE ALLOWED TO NATURALLY INFILTRATE AND/OR EVAPORATE. SETTLING PONDS WILL THEN BE REVEGETATED IN THE SAME MANNER AS THE REMAINDER OF THE SITE.
11. NOMINAL VOLUMES OF CLEAN, INERT FILL FROM ON-SITE OPERATIONS OR IMPORT WILL BE PLACED IN THE FINISHED EXCAVATION PITS PRIOR TO REVEGETATION, CONSISTENT WITH THE EXISTING SPECIFIC PLAN/CITY APPROVALS.

REVEGETATION SEED MIX:

COMMON NAME	SCIENTIFIC NAME	SEEDING RATE (LBS./ACRE)[1]	
		MINIMUM	MAXIMUM
CALIFORNIA SAGEBRUSH	*ARTEMISIA CALIFORNICA*	1.0	2.0
CHAMISE	*ADENOSTOMA FASCICULATUM*	2.0	4.0
FLATTOPPED BUCKWHEAT	*ERIOGONUM FASCICULATUM*	8.0	12.0
SCALEBROOM	*LEPIDOSPARTUM SQUAMATUM*	3.0	5.0
BLACK SAGE	*SALVIA MELLIFERA*	1.0	2.0
GOLDEN ASTER	*CHRYSOPSIS VILLOSA*	0.25	0.5
SLENDER BUCKWHEAT	*ERIOGONUM GRACILE (E. DAVIDSONII)*	1.0	2.0
CALIFORNIA CROTON	*CROTON CALIFORNICUS*	0.25	0.5
MOUNTAIN MAHOGANY	*CERCOCARPUS BETULOIDES*	0.5	1.5
CALIFORNIA EVERLASTING	*GNAPHALIUM CALIFORNICUM*	0.5	1.0
SHOWY PENSTEMON	*PENSTEMON SPECTABLIS*	0.5	1.5
DEERWEED	*LOTUS SCOPARIUS*	4.0	8.0
CHIA	*SALVIA COLUMBARIAE*	0.5	2.0
WHITE SAGE	*SALVIA APIANA*	1.0	2.0
BRANCHING PHACELIA	*PHACELIA RAMOSISSIMA*	0.25	1.0
RED BERRY	*RHAMNUS CROCEA*	1.0	2.0
BUTTERWEED	*SENECIO DOUGLASII*	0.25	0.5
GIANT STIPA	*STIPA CORONATA*	1.0	2.0
CHAPARRAL YUCCA	*YUCCA WHIPPLEI*	1.0	2.0
	TOTAL:	27.0	51.5

[1] RANGE SHOWN REPRESENTS MINIMUM AND MAXIMUM SEEDING RATE (LBS./ACRE) THAT SHOULD BE UTILIZED DURING HYDROSEEDING.

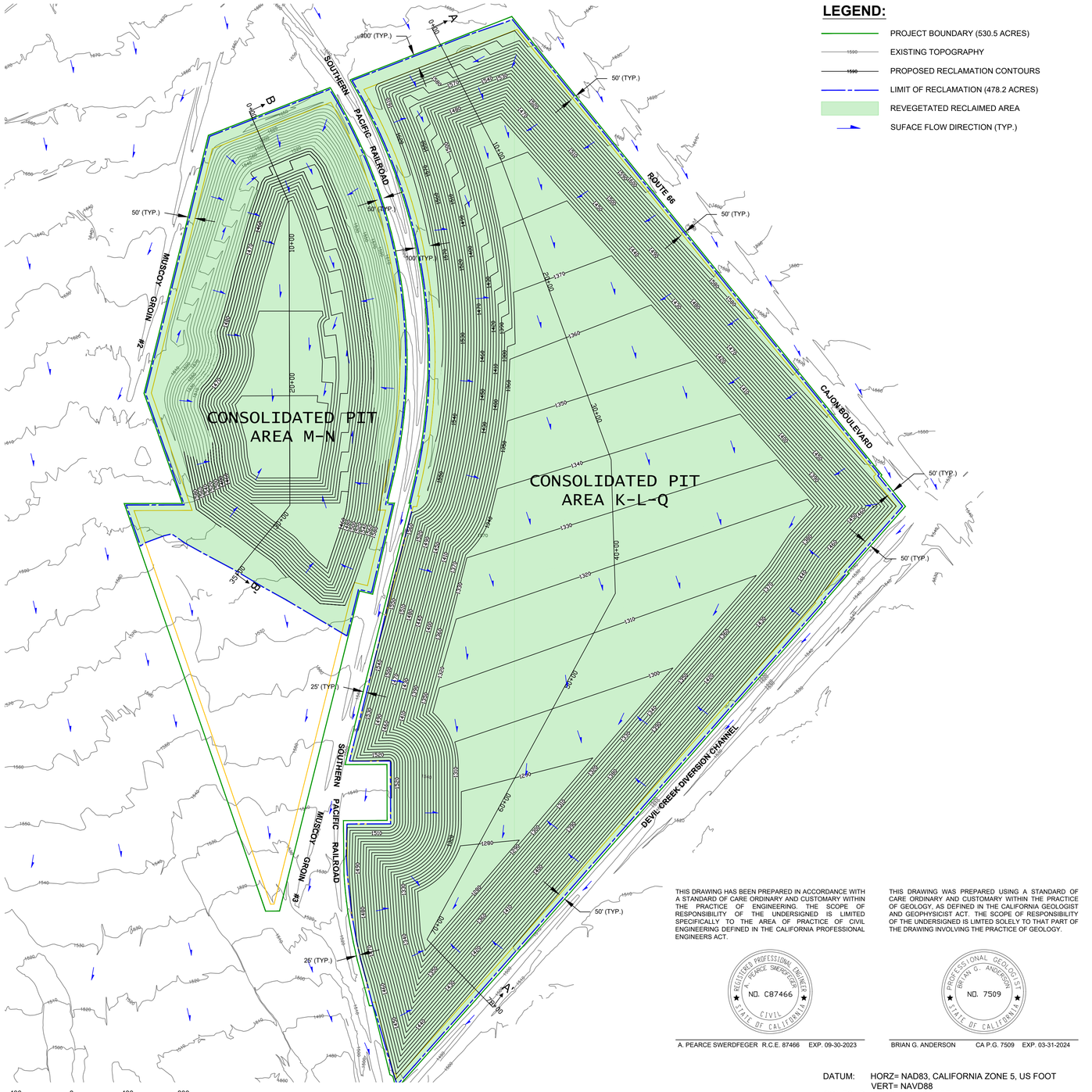
FIVE-YEAR PERFORMANCE STANDARDS FOR REVEGETATION:

PERFORMANCE CRITERIA	MONITORING METHOD	SUCCESS CRITERIA (5-YEAR)[1]	MANAGEMENT RESPONSE
VEGETATIVE COVER	TRANSECT/PLOT OR AERIAL PHOTO ANALYSIS	25% COVER ALL NATIVE PERENNIALS COMBINED PER 50-METER BY 1-METER TRANSECT	RESEED AND/OR IDENTIFY AND REPAIR INFLUENCING VARIABLE
DENSITY	TRANSECT/PLOT	5 NATIVE PERENNIAL SPECIES PER 50-METER BY 1-METER TRANSECT	SUBSTITUTE FAILING SPECIES WITH PLANTED SPECIES THAT IS THRIVING
SPECIES RICHNESS	TRANSECT/PLOT	20 NATIVE PERENNIALS PER 50-METER BY 1-METER TRANSECT	RESEED AND/OR IDENTIFY AND REPAIR INFLUENCING VARIABLE

[1] WITHIN THE RECLAMATION AREA, SIX (6) RANDOMLY PLACED 50-METER BY 1-METER TRANSECTS WILL BE UTILIZED TO DETERMINE THE SUCCESS OF REVEGETATION EFFORTS AT PROJECT SITE. DATA FOR ALL TRANSECTS WILL BE AVERAGED TO PRODUCE THE FINAL SUCCESS CRITERIA RESULTS.

RECLAMATION TIMELINE:

ACTIVITY	APPROXIMATE SIZE (ACRES)	SCHEDULE		LAND USE / END USE
		START	END	
SITE PREPARATION	478.2	ONGOING	MARCH 2023	CLEARED SITE
MINING	410.2	ONGOING	DECEMBER 2093	EXCAVATED PIT
RECLAMATION	478.2	JANUARY 2094	DECEMBER 2095	OPEN SPACE
RECLAMATION MONITORING	478.2	JANUARY 2096	DECEMBER 2098	REVEGETATED OPEN SPACE



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PROFESSIONAL GEOLOGIST — BRIAN G. ANDERSON — No. 7509 — STATE OF CALIFORNIA

BRIAN G. ANDERSON CA P.G. 7509 EXP. 03-31-2024

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88
CONTOUR INTERVAL: 10 FEET
SOURCES: SEE SHEET 1

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MARK	DATE	DESCRIPTION	BY
	12/20/22	INITIAL DRAFT	GJC

REVIEWED BY: DATE DATE

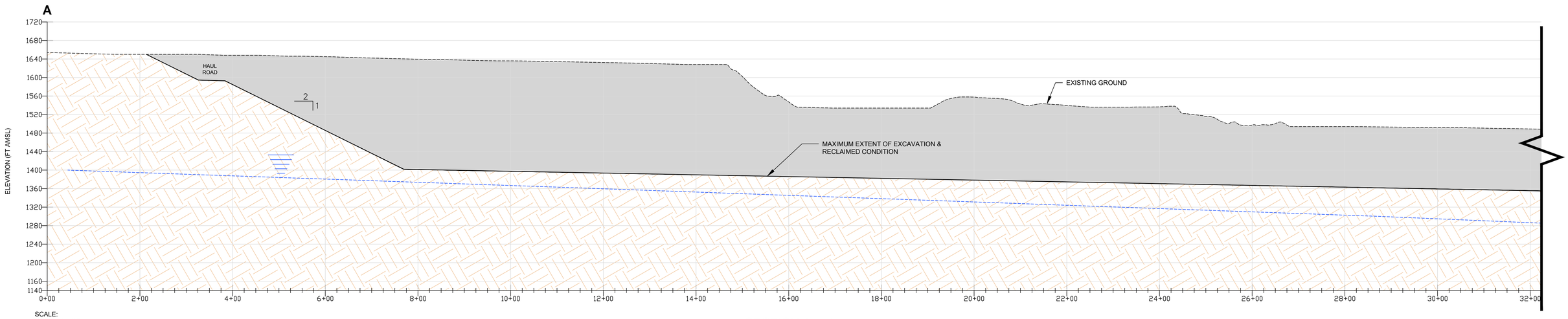
VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

RECLAMATION PLAN

SCALE: HORZ. AS SHOWN VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

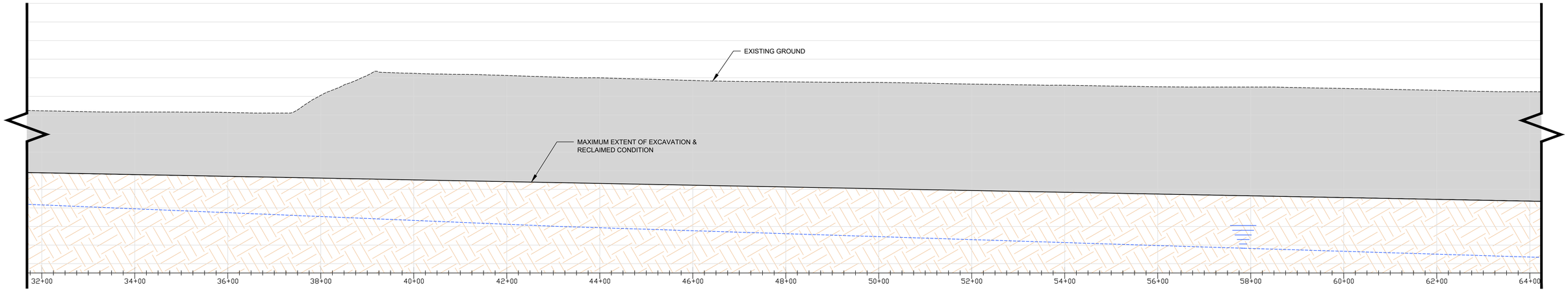
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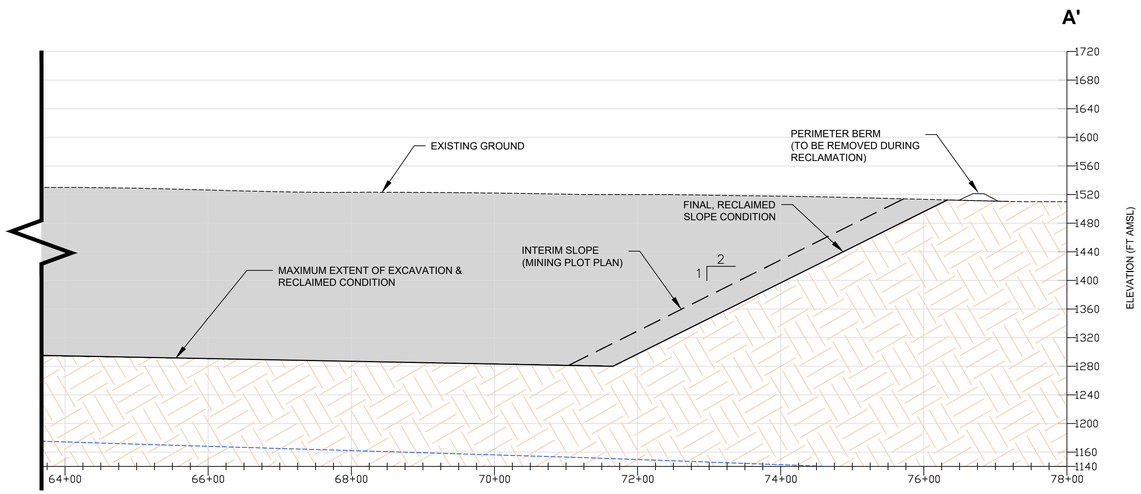
SCALE:
HORIZ: 1" = 100'
VERT: 1" = 100'

SECTION A - A'



SCALE:
HORIZ: 1" = 100'
VERT: 1" = 100'

SECTION A - A' (CONTINUED)



SCALE:
HORIZ: 1" = 100'
VERT: 1" = 100'

SECTION A - A' (CONTINUED)

NOTES:

1. APPROXIMATE GROUNDWATER ELEVATION SHOWN ON THE SECTIONS HEREON DERIVED BY FROM INFORMATION PROVIDED IN *HYDROGEOLOGIC INVESTIGATION, CAJON CREEK CONSOLIDATED QUARRY PROJECT* (REPORT DATE: SEPTEMBER 2, 2021).

THIS DRAWING HAS BEEN PREPARED IN ACCORDANCE WITH A STANDARD OF CARE ORDINARY AND CUSTOMARY WITHIN THE PRACTICE OF ENGINEERING. THE SCOPE OF RESPONSIBILITY OF THE UNDERSIGNED IS LIMITED SPECIFICALLY TO THE AREA OF PRACTICE OF CIVIL ENGINEERING DEFINED IN THE CALIFORNIA PROFESSIONAL ENGINEERS ACT.

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PROFESSIONAL GEOLOGIST — BRIAN G. ANDERSON — NO. 7509 — STATE OF CALIFORNIA

BRIAN G. ANDERSON CA P.G. 7509 EXP. 03-31-2024

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DATE
DATE

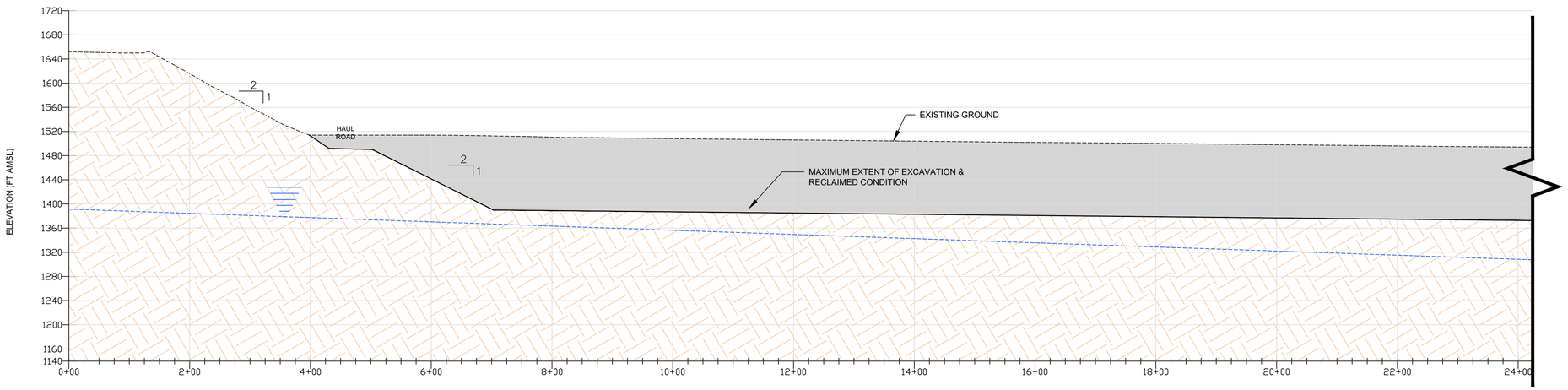
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CAJON CREEK CONSOLIDATED QUARRY

CROSS SECTION A - A'

SCALE: HORIZ: AS SHOWN
VERT: AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER
5

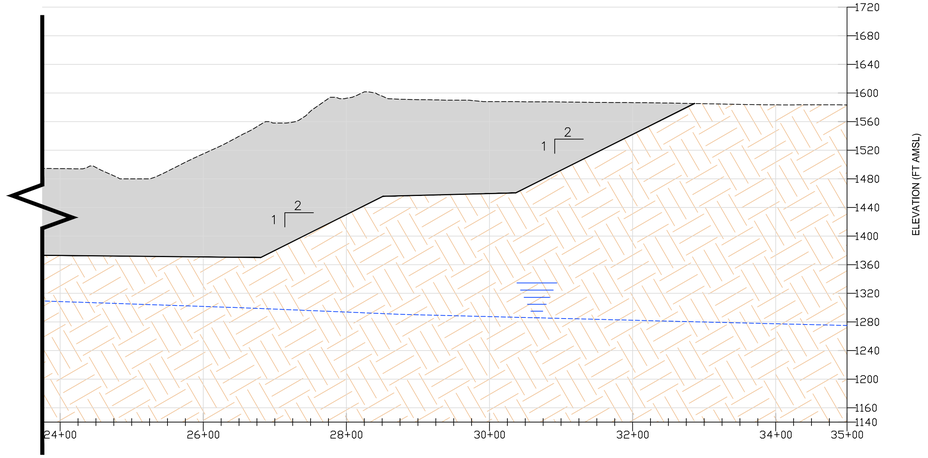
B



SCALE:
HORIZ: 1" = 100'
VERT: 1" = 100'

SECTION B - B'

B'



SCALE:
HORIZ: 1" = 100'
VERT: 1" = 100'

SECTION B - B' (CONTINUED)

NOTES:

1. APPROXIMATE GROUNDWATER ELEVATION SHOWN ON THE SECTIONS HEREON DERIVED BY FROM INFORMATION PROVIDED IN *HYDROGEOLOGIC INVESTIGATION, CAJON CREEK CONSOLIDATED QUARRY PROJECT* (REPORT DATE: SEPTEMBER 2, 2021).

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PROFESSIONAL GEOLOGIST — BRYANT G. ANDERSON — NO. 7509 — STATE OF CALIFORNIA

BRIAN G. ANDERSON CA P.G. 7509 EXP. 03-31-2024

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DATE
DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

CROSS-SECTION B - B'

SCALE: HORIZ AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

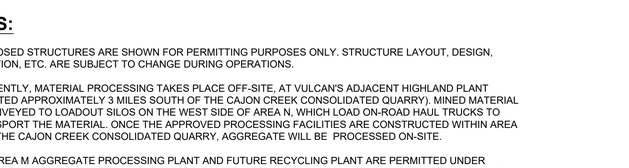
FIGURE NUMBER
6



INDEX MAP

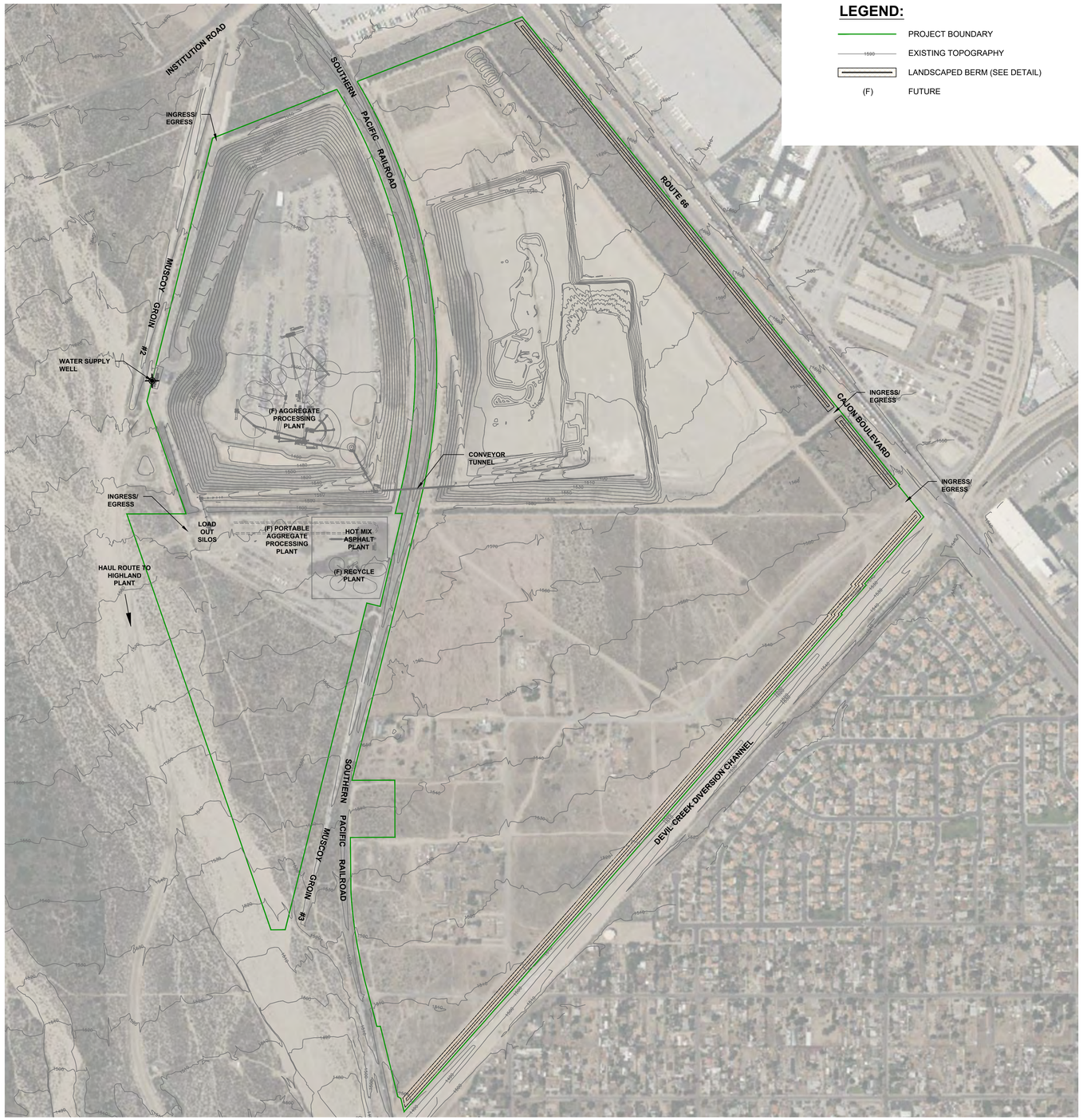
NOTES:

1. PROPOSED STRUCTURES ARE SHOWN FOR PERMITTING PURPOSES ONLY. STRUCTURE LAYOUT, DESIGN, LOCATION, ETC. ARE SUBJECT TO CHANGE DURING OPERATIONS.
2. CURRENTLY, MATERIAL PROCESSING TAKES PLACE OFF-SITE, AT VULCAN'S ADJACENT HIGHLAND PLANT (LOCATED APPROXIMATELY 3 MILES SOUTH OF THE CAJON CREEK CONSOLIDATED QUARRY). MINED MATERIAL IS CONVEYED TO LOADOUT SILOS ON THE WEST SIDE OF AREA N, WHICH LOAD ON-ROAD HAUL TRUCKS TO TRANSPORT THE MATERIAL. ONCE THE APPROVED PROCESSING FACILITIES ARE CONSTRUCTED WITHIN AREA M OF THE CAJON CREEK CONSOLIDATED QUARRY, AGGREGATE WILL BE PROCESSED ON-SITE.
3. THE AREA M AGGREGATE PROCESSING PLANT AND FUTURE RECYCLING PLANT ARE PERMITTED UNDER CONDITIONAL USE PERMIT (CUP) 91-31, SPECIFIC PLAN SP NO. 90-01, AND DEVELOPMENT PERMIT 97-24. THE EXACT LOCATION OF THE RECYCLE PLANT WITHIN AREA M OR L HAS NOT BEEN DETERMINED AT THIS TIME, AND IS THEREFORE NOT SHOWN ON THE SITE PLAN.
4. AT THE CESSATION OF MINING IN AREAS K, L, AND Q, A PORTABLE PROCESSING PLANT WILL BE INSTALLED IN THE AREA N PIT SO THAT THE MATERIAL FROM BENEATH THE CURRENT PROCESSING PLANT(S) IN AREA M CAN BE EXTRACTED AND PROCESSED.
5. AREA N HOT MIX ASPHALT PLANT PERMITTED UNDER DEVELOPMENT PERMIT MM 22-08.



BERM DETAIL

N.T.S.
DETAIL FOR PERIMETER BERM IN AREA K AND Q



LEGEND:

- PROJECT BOUNDARY
- 1590 EXISTING TOPOGRAPHY
- LANDSCAPED BERM (SEE DETAIL)
- (F) FUTURE

N

400 0 400 800
SCALE IN FEET
SCALE: 1" = 400'
SCALE INDICATED IS BASED ON A
24" X 36" FORMAT PRINT

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88
CONTOUR INTERVAL: 10 FEET
SOURCES: SEE SHEET 1

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DATE
DATE

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

SITE LAYOUT PLAN

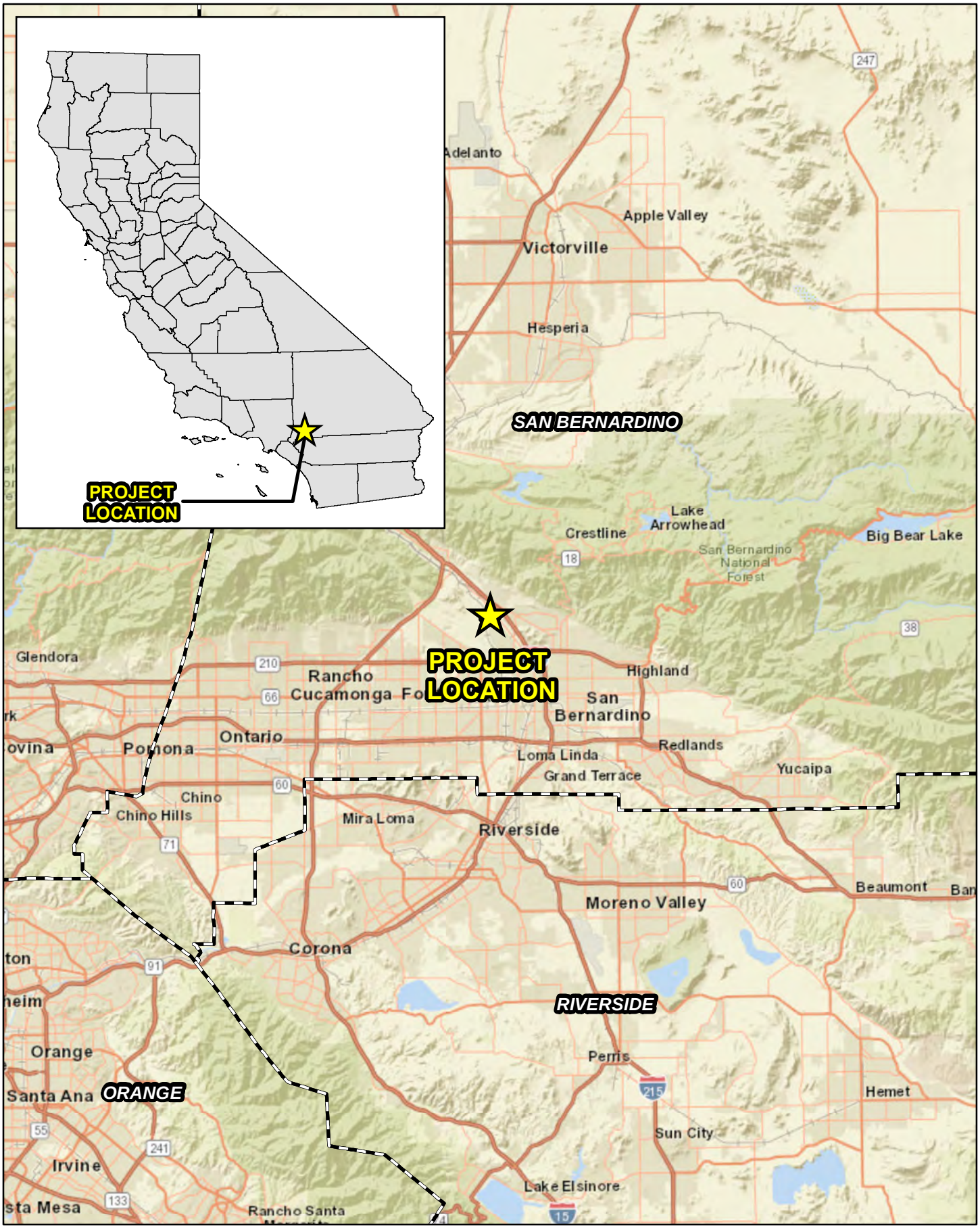
SCALE: HORIZ. AS SHOWN
VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: BGA / APS

FIGURE NUMBER 7

Plot Date: C:\Users\Pearce.Swerdfeger\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\CAD\Consolidated Mine & Rec Plan\Vulcan–CajonCreek–ConsolidatedMP–v1.0.dwg Jun 12, 2023, 4:01pm Pearce.Swerdfeger

Attachment B

Project Exhibits

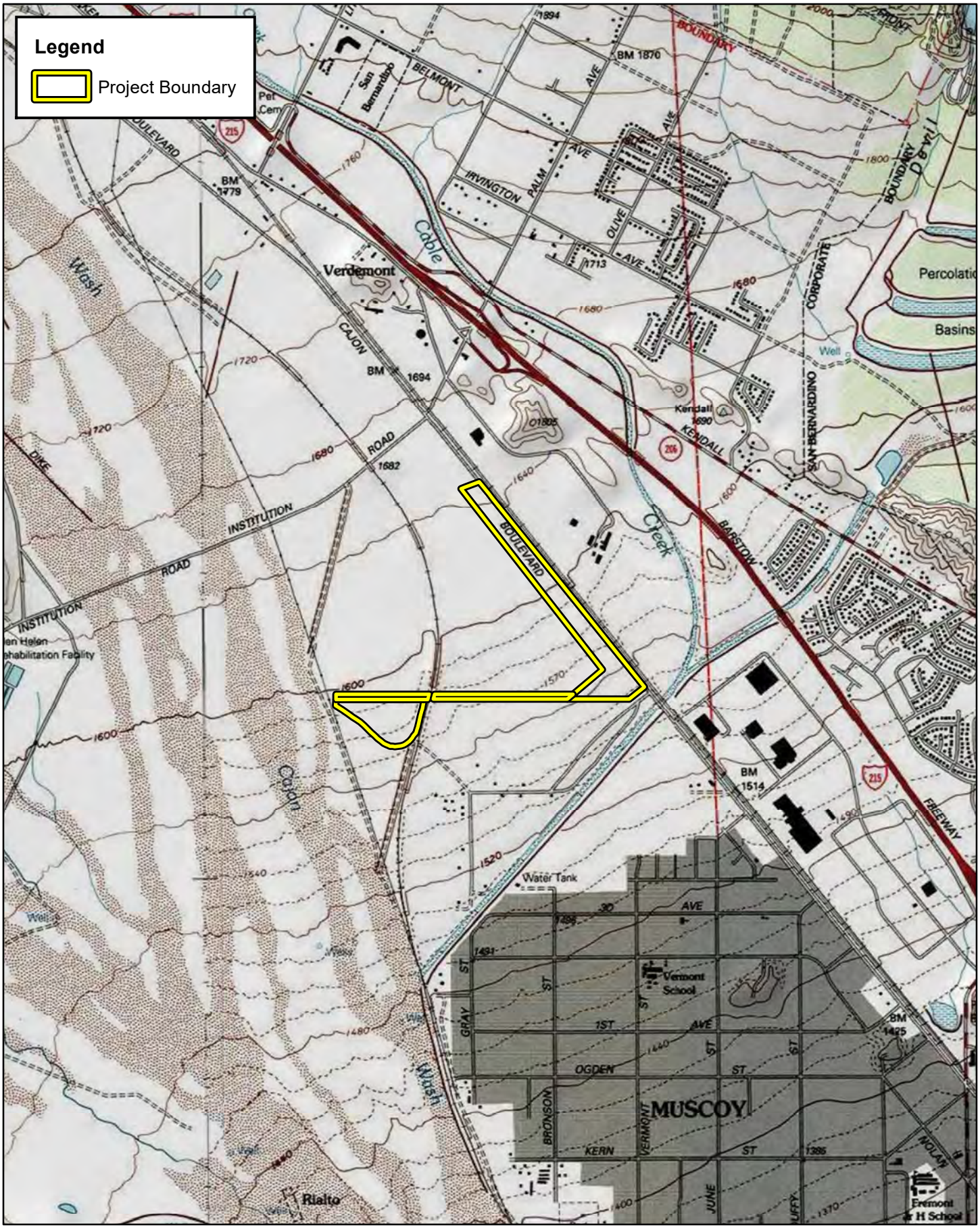


Source: World Street Map, San Bernardino County

CAJON CREEK CONSOLIDATION PROJECT
HABITAT AND JURISDICTIONAL ASSESSMENT

Regional Vicinity

Exhibit 1



CAJON CREEK CONSOLIDATION PROJECT
HABITAT AND JURISDICTIONAL ASSESSMENT

Site Vicinity

ELMT CONSULTING

0 1,000 2,000 4,000 Feet

Source: USA Topographic Map, San Bernardino County

Exhibit 2



CAJON CREEK CONSOLIDATION PROJECT
HABITAT AND JURISDICTIONAL ASSESSMENT

ELMT CONSULTING

0 500 1,000 2,000 Feet

Source: ESRI Aerial Imagery, San Bernardino County

Project Site

Exhibit 3



CAJON CREEK CONSOLIDATION PROJECT
HABITAT AND JURISDICTIONAL ASSESSMENT

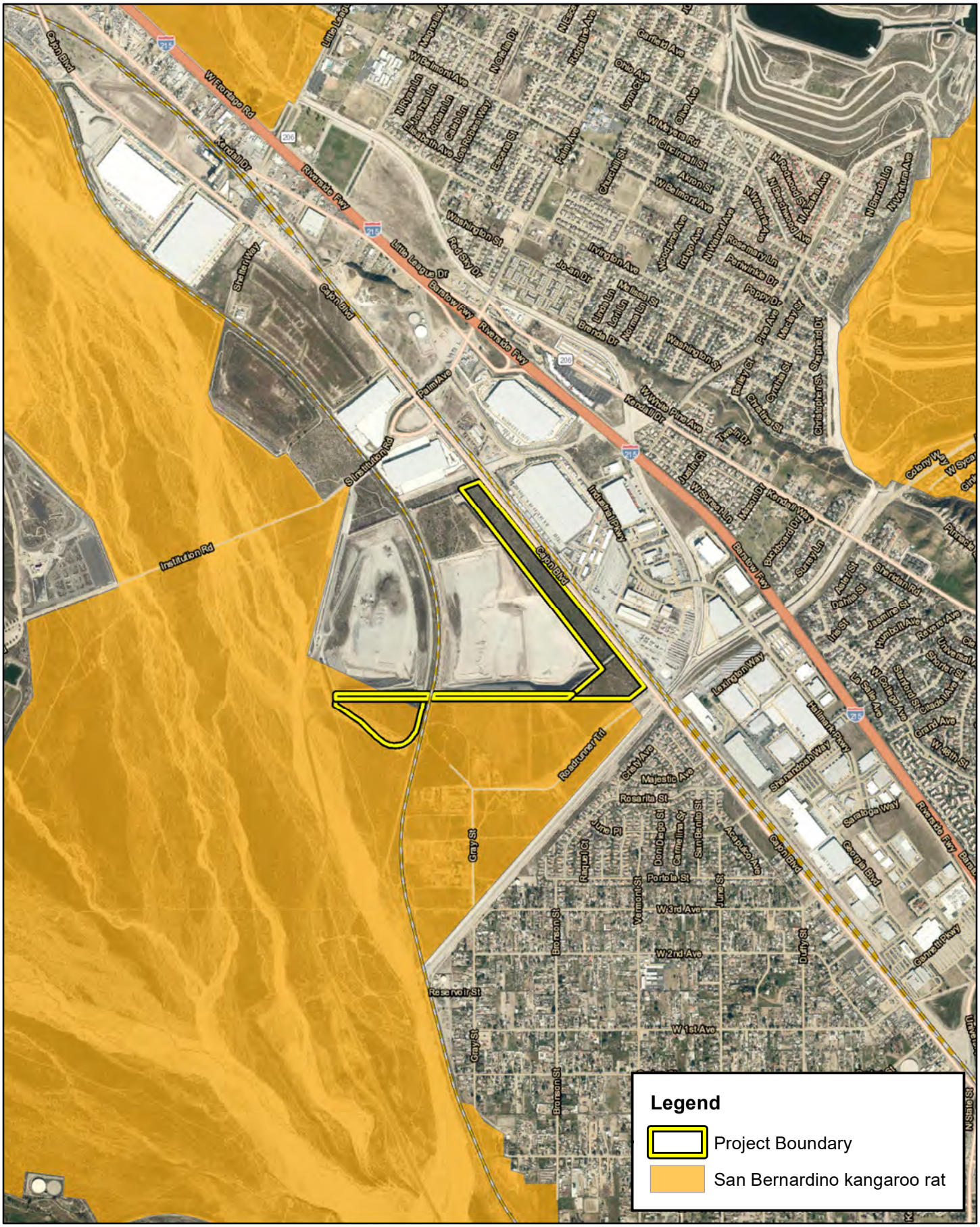
Vegetation

ELMT CONSULTING

0 500 1,000 2,000 Feet

Source: ESRI Aerial Imagery, San Bernardino County

Exhibit 4



CAJON CREEK CONSOLIDATION PROJECT
HABITAT AND JURISDICTIONAL ASSESSMENT

Critical Habitat

ELMT CONSULTING

0 1,000 2,000 4,000 Feet

Source: ESRI Aerial Imagery, USFWS Critical Habitat, San Bernardino County

Exhibit 5

Attachment C

Site Photographs



Photograph 1: From the northwest corner of the project site looking east along the northern boundary. The disturbed/isolated intermediate RAFSS habitat is in the background.



Photograph 2: From the northwest corner of the project site looking southeast along the eastern boundary.



Photograph 3: From the northeast corner of the project site looking west along the northern boundary.



Photograph 4: From the northwest corner of the project site looking southeast along the eastern boundary.



Photograph 5: From the southeast corner of the project site looking northwest along the western boundary.



Photograph 6: From the southeast corner of the project site looking northwest along the eastern boundary.



Photograph 7: View of the non-native grassland in in southern portion of Area K.



Photograph 8: From the eastern boundary of the project site looking west, ornamental vegetation in the background.



Photograph 9: View overlooking the disturbed land within Area N.



Photograph 10: Looking east at Area N.



Photograph 11: View of the western portion of Area N.



Photograph 12: From the northwest corner of Area N looking northeast at the disturbed area.



Photograph 13: Interstitial area between Area L and Q.



Photograph 14: Interstitial area between Area M and N.

Attachment D

Potentially Occurring Special-Status Biological Resources

Table D-1: Potentially Occurring Special-Status Biological Resources

Scientific Name Common Name	Status	Habitat	Observed Onsite
Special-Status Wildlife Species			
Accipiter cooperii Cooper's hawk	Fed: None CA: WL	Generally found in forested areas up to 3,000 feet in elevation, especially near edges and rivers. Prefers hardwood stands and mature forests, but can be found in urban and suburban areas where there are tall trees for nesting. Common in open areas during nesting season.	No
Aimophila ruficeps canescens southern California rufous-crowned sparrow	Fed: None CA: WL	Typically found between 3,000 and 6,000 feet in elevation. Breed in sparsely vegetated shrublands on hillsides and canyons. Prefers coastal sage scrub dominated by California sagebrush (*Artemisia californica*), but can also be found breeding in coastal bluff scrub, low-growing serpentine chaparral, and along the edges of tall chaparral habitats.	No
Anniella pulchra Northern California legless lizard	Fed: None CA: SSC	Occurs primarily in areas with sandy or loose loamy soils under sparse vegetation of beaches, chaparral, or pine-oak woodland; or near sycamores, oaks, or cottonwoods that grow on stream terraces. Often found under or in the close vicinity of logs, rocks, old boards, and the compacted debris of woodrat nests.	No
Anniella stebbinsi Southern California legless lizard	Fed: None CA: SSC	Occurs primarily in areas with sandy or loose loamy soils under sparse vegetation of beaches, chaparral, or pine-oak woodland; or near sycamores, oaks, or cottonwoods that grow on stream terraces. Often found under or in the close vicinity of logs, rocks, old boards, and the compacted debris of woodrat nests.	No
Aquila chrysaetos golden eagle	Fed: None CA: FP; WL	Occupies nearly all terrestrial habitats of the western states except densely forested areas. Favors secluded cliffs with overhanging ledges and large trees for nesting and cover. Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats. Deeply cut canyons rising to open mountain slopes and crags are ideal habitat.	No
Ardea alba great egret	Fed: None CA: None	Yearlong resident throughout California, except for the high mountains and deserts. Feeds and rests in fresh, and saline emergent wetlands, along the margins of estuaries, lakes, and slow-moving streams, on mudflats and salt ponds, and in irrigated croplands and pastures.	No
Arizona elegans occidentalis California glossy snake	Fed: None CA: SSC	Occurs in a wide variety of habitat types including open desert, grasslands, shrublands, chaparral, and woodlands. Prefers areas where the soil is loose and sandy which allows for burrowing.	No
Artemisiospiza belli belli Bell's sage sparrow	Fed: None CA: WL	Occurs in chaparral dominated by fairly dense stands of chamise. Also found in coastal sage scrub in south of range.	No
Asio otus long-eared owl	Fed: None CA: SSC	Hunts mostly at night over grasslands and other open habitats. Nesting occurs in dense trees such as oaks and willows where it occupies stick nests of other species, particularly raptors or corvids.	No

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**
Aspidoscelis hyperythra orangethroat whiptail	Fed: None CA: WL	Inhabits low-elevations coastal scrub, chamise-redshank chaparral, mixed chaparral, and valley-foothill hardwood habitats. Semi-arid brushy areas typically with loose soil and rocks, including washes, streamsides, rocky hillsides, and coastal chaparral.	No
Aspidoscelis tigris stejnegeri coastal whiptail	Fed: None CA: SSC	Found in a variety of ecosystems, primarily hot and dry open areas with sparse foliage such as chaparral, woodland, and riparian areas.	No
Athene cunicularia burrowing owl	Fed: None CA: SSC	Prefers habitat with short, sparse vegetation with few shrubs and well-drained soils in grassland, shrub steppe, and desert habitats. Primarily a grassland species, but it persists and even thrives in some landscapes highly altered by human activity. Occurs in open, annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. The overriding characteristics of suitable habitat appear to be burrows for roosting and nesting and relatively short vegetation with only sparse shrubs and taller vegetation.	No
Baeolophus inornatus oak titmouse	Fed: None CA: None	Lives mostly in warm, open, dry oak or oak-pine woodlands. Restricted to southwest Oregon to northwest Baja California with another population in the Cape District of south Baja California.	No
Batrachoseps gabrieli San Gabriel slender salamander	Fed: None CA: None	Known from select localities in the San Gabriel Mountains and the Mt. Baldy area of Los Angeles County and the western end of the San Bernardino Mountains in San Bernardino Co., with an elevation range of 1,200- 5,085 feet. Occurs on talus slopes surrounded by a variety of conifer and montane hardwood species, including bigcone spruce, pine, white fir, incense cedar, canyon live oak, black oak, and California laurel.	No
Bombus crotchii Crotch bumble bee	Fed: None CA: CE	Exclusive to coastal California east towards the Sierra-Cascade Crest; less common in western Nevada.	No
Buteo regalis ferruginous hawk	Fed: None CA: WL	Occurs primarily in open grasslands and fields, but may be found in sagebrush flats, desert scrub, low foothills, or along the edges of pinyon-juniper woodland. Feeds primarily on small mammals and typically found in agricultural or open fields.	No
Calypte costae Costa's hummingbird	Fed: None CA: None	Desert and semi-desert, arid brushy foothills and chaparral. A desert hummingbird that breeds in the Sonoran and Mojave Deserts. Departs desert heat moving into chaparral, scrub, and woodland habitats.	No
Chaetodipus fallax fallax northwestern San Diego pocket mouse	Fed: None CA: SSC	Occurs in desert and coastal habitats in southern California, Mexico, and northern Baja California, from sea level to at least 1,400 meters above msl. Found in a variety of temperate habitats ranging from chaparral and grasslands to scrub forests and deserts. Requires low growing vegetation or rocky outcroppings, as well as sandy soils for burrowing.	No
Chaetodipus fallax pallidus pallid San Diego pocket mouse	Fed: None CA: SSC	Occurs in sandy herbaceous areas, usually in association with rocks or coarse gravel in desert wash, desert scrub, desert succulent scrub, and pinyon-juniper communities.	No

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**
Charina umbratica southern rubber boa	Fed: None CA: **THR**	Found in a variety of montane forest habitats, particularly in the vicinity of streams or wet meadows. Requires loose, moist soil for burrowing and seeks cover in rotting logs. Restricted to the San Bernardino and San Jacinto Mountains.	No
Circus hudsonius northern harrier	Fed: None CA: SSC	Frequents meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas. Mostly found in flat, or hummocky, open areas of tall, dense grasses moist or dry shrubs, and edges for nesting, cover, and feeding.	No
Contopus cooperi olive-sided flycatcher	Fed: None CA: SSC	Uncommon to common, summer resident in a wide variety of forest and woodland habitats below 9,000 ft. throughout California exclusive of the deserts, the Central Valley, and other lowland valleys and basins. Preferred nesting habitats include mixed conifer, montane hardwood-conifer, Douglas-fir, redwood, red fir, and lodgepole pine.	No
Diadophis punctatus modestus San Bernardino ringneck snake	Fed: None CA: None	Common in open, relatively rocky areas within valley-foothill, mixed chaparral, and annual grassland habitats.	No
Dipodomys merriami parvus San Bernardino kangaroo rat	Fed: **END** CA: CE; SSC	Primarily found in Riversidian alluvial fan sage scrub and sandy loam soils, alluvial fans and flood plains, and along washes with nearby sage scrub. May occur at lower densities in Riversidian upland sage scrub, chaparral and grassland in uplands and tributaries in proximity to Riversidian alluvial fan sage scrub habitats. Tend to avoid rocky substrates and prefer sandy loam substrates for digging of shallow burrows.	No
Dipodomys simulans Dulzura kangaroo rat	Fed: None CA: None	Relatively common in chaparral, coastal sage scrub, Riversidean alluvial fan sage scrub, and peninsular juniper woodland habitats.	No
Elanus leucurus white-tailed kite	Fed: None CA: FP	Occurs in low elevation, open grasslands, savannah-like habitats, agricultural areas, wetlands, and oak woodlands. Uses trees with dense canopies for cover.	No
Empidonax traillii willow flycatcher	Fed: None CA: **END**	A rare to locally uncommon, summer resident in wet meadow and montane riparian habitats (2,000 to 8,000 ft) in the Sierra Nevada and Cascade Range. Most often occurs in broad, open river valleys or large mountain meadows with lush growth of shrubby willows.	No
Empidonax traillii extimus southwestern willow flycatcher	Fed: **END** CA: **END**	Occurs in riparian woodlands in southern California. Typically requires large areas of willow thickets in broad valleys, canyon bottoms, or around ponds and lakes. These areas typically have standing or running water, or are at least moist.	No
Eremophila alpestris actia California horned lark	Fed: None CA: WL	Generally found in shortgrass prairies, grasslands, disturbed fields, or similar habitat types. Flocks in groups.	No
Euchloe hyantis andrewsi Andrew's marble butterfly	Fed: None CA: None	Inhabits yellow pine forests near Lake Arrowhead and Big Bear Lake at elevations between 5,000 and 6,000 feet. Uses Laguna Mountains jewelflower (*Streptanthus bernardinus*) and pine rockcress (*Arabis holboelli var. pinetorum*) as host plants; larvae feed on mountain tansy mustard (*Descurainia incana*).	No

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**
Euphydryas editha quino Quino checkerspot butterfly	Fed: **END** CA: None	Range is now limited to a few populations in Riverside and San Diego counties. Common in meadows and upland sage scrub/chapparal habitat.	No
Falco columbarius merlin	Fed: None CA: WL	Nest in forested openings, edges, and along rivers across northern North America. Found in open forests, grasslands, and especially coastal areas with flocks of small songbirds or shorebirds.	No
Falco mexicanus prairie falcon	Fed: None CA: WL	Commonly occur in arid and semiarid shrubland and grassland community types. Also occasionally found in open parklands within coniferous forests. During the breeding season, they are found commonly in foothills and mountains which provide cliffs and escarpments suitable for nest sites.	No
Glaucomys oregonensis californicus San Bernardino flying squirrel	Fed: None CA: SSC	Occurs in white fir (*Abies concolor*) and Jeffrey pine (*Pinus jeffreyi*) mixed conifer forests with black oak (*Quercus kelloggii*) components at higher elevations. Use cavities in large trees, snags, and logs for cover. Habitats are typically mature, dense conifer forest in close proximity to riparian areas.	No
Gymnogyps californianus California condor	Fed: **END** CA: **END**; FP	Permanent resident of the semi-arid, rugged mountain ranges surrounding the southern San Joaquin Valley, including the Coast Ranges from Santa Clara Co. south to Los Angeles Co., the Transverse Ranges, Tehachapi Mts., and southern Sierra Nevada. Forages over wide areas of open rangelands, roots on cliffs and in large trees and snags.	No
Icteria virens yellow-breasted chat	Fed: None CA: SSC	Primarily found in tall, dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with well-developed understories. Nesting areas are associated with streams, swampy ground, and the borders of small ponds. Breeding habitat must be dense to provide shade and concealment. It winters south to Central America.	No
Lanius ludovicianus loggerhead shrike	Fed: None CA: SSC	Often found in broken woodlands, shrublands, and other habitats. Prefers open country with scattered perches for hunting and fairly dense brush for nesting.	No
Lasiurus xanthinus western yellow bat	Fed: None CA: SSC	Roosts in palm trees in foothill riparian, desert wash, and palm oasis habitats with access to water for foraging.	No
Lepus californicus bennettii San Diego black-tailed jackrabbit	Fed: None CA: SSC	Occurs in diverse habitats, but primarily is found in arid regions supporting shortgrass habitats. Openness of open scrub habitat is preferred over dense chaparral.	Yes
Microtus californicus mohavensis Mohave river vole	Fed: None CA: SSC	Found in moist habitats including meadows, freshwater marshes and irrigated pastures in the vicinity of the Mojave River. Suitable habitat it associated with ponds and irrigation canals along with the Mojave River proper. Alfalfa fields may also provide habitat.	No
Neolarra alba white cuckoo bee	Fed: None CA: None	Found in dry, sandy areas (particularly deserts) in the American southwest near the host plants for *Perdita* bee species, of which it is a nest parasite.	No
Neotoma lepida intermedia San Diego desert woodrat	Fed: None CA: SSC	Occurs in coastal scrub communities between San Luis Obispo and San Diego Counties. Prefers moderate to dense canopies, and especially rocky outcrops.	No

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**
Nyctinomops femorosaccus pocketed free-tailed bat	Fed: None CA: SSC	Often found in pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis.	No
Pandion haliaetus osprey	Fed: None CA: WL	Occurs in a variety of plant communities in association with riparian habitats including shrublands, grasslands, swamps, and coniferous and deciduous forests. In California, ospreys are primarily associated with ponderosa pine (Pine ponderosa) and mixed-conifer types.	No
Perognathus longimembris brevinasus Los Angeles pocket mouse	Fed: None CA: SSC	Occurs in lower elevation grasslands and coastal sage scrub communities in and around the Los Angeles Basin. Prefers open ground with fine sandy soils. May not dig extensive burrows, but instead will seek refuge under weeds and dead leaves instead.	No
Perognathus longimembris pacificus Pacific pocket mouse	Fed: **END** CA: SSC	Occurs on loose sandy soils that support sparse coastal sage scrub, grassland, and ruderal habitats.	No
Phrynosoma blainvillii coast horned lizard	Fed: None CA: SSC	Found in a wide variety of vegetation types including coastal sage scrub, annual grassland, chaparral, oak woodland, riparian woodland and coniferous forest. The key elements of such habitats are loose, fine soils with a high sand fraction; an abundance of native ants or other insects; and open areas with limited overstory for basking and low, but relatively dense shrubs for refuge.	No
Polioptila californica californica coastal California gnatcatcher	Fed: **THR** CA: SSC	Obligate resident of sage scrub habitats that are dominated by California sagebrush (*Artemisia californica*). This species generally occurs below 750 feet elevation in coastal regions and below 1,500 feet inland. Ranges from the Ventura County, south to San Diego County and northern Baja California and it is less common in sage scrub with a high percentage of tall shrubs. Prefers habitat with more low-growing vegetation.	No
Progne subis purple martin	Fed: None CA: SSC	Summer resident in a variety of wooded, low-elevation habitats throughout the state. Uses valley foothill and montane hardwood, valley foothill and montane hardwood-conifer, and riparian habitats. Also occurs in coniferous habitats, including closed-cone pine-cypress, ponderosa pine, Douglas-fir, and redwood.	No
Pyrocephalus rubinus vermilion flycatcher	Fed: None CA: SSC	Occupies desert riparian habitat, particularly cottonwoods, willows, mesquite, and other large desert riparian trees, in habitat adjacent to irrigated fields, irrigation ditches, pastures, and other open, mesic areas where it can forage.	No
Rana draytonii California red-legged frog	Fed: **THR** CA: SSC	Inhabits quiet pools of streams, marshes, and occasionally ponds. Occurs along the coast ranges from Mendocino County south and in portions of the Sierra Nevada and Cascades ranges.	No
Rana muscosa southern mountain yellow-legged frog	Fed: **END** CA: **END**; WL	Prefers high-altitude mountain streams, typically those with boulders in them. Always found in the water, on rocks, or within a foot or two of the water's edge.	No

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**
Rhinichthys osculus* ssp. *3 Santa Ana speckled dace	Fed: None CA: SSC	Requires permanent flowing streams within summer water temperatures of 17 – 20 degrees Celsius. Inhabits shallow cobble and gravel riffles and small streams that flow through steep, rocky canyons with chaparral covered walls.	No
Salvadora hexalepis virgultea coast patch-nosed snake	Fed: None CA: SSC	Found in brushy or shrubby vegetation along the coast and requires small mammal burrows for refuge and overwintering.	No
Setophaga petechia yellow warbler	Fed: None CA: SSC	Nests over all of California except the Central Valley, the Mojave Desert region, and high altitudes and the eastern side of the Sierra Nevada. Winters along the Colorado River and in parts of Imperial and Riverside Counties. Nests in riparian areas dominated by willows, cottonwoods, sycamores, or alders or in mature chaparral. May also use oaks, conifers, and urban areas near stream courses.	No
Spea hammondii western spadefoot	Fed: None CA: SSC	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washed, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rainpools which do not contain bullfrogs, fish, or crayfish are necessary for breeding.	No
Spinus lawrencei Lawrence's goldfinch	Fed: None CA: None	Open woodlands, chaparral, and weedy fields. Closely associated with oaks. Nests in open oak or other arid woodland and chaparral near water.	No
Strix occidentalis occidentalis California spotted owl	Fed: None CA: SSC	Breeds and roosts in forests and woodland with large old trees and snags, high basal areas of trees and snags, dense canopies, multiple canopy layers, and downed woody debris. Large old trees are key as they provide nest sites and cover from weather.	No
Taxidea taxus American badger	Fed: None CA: SSC	Primarily occupy grasslands, parklands, farms, tallgrass and shortgrass prairies, meadows, shrub-steppe communities and other treeless areas with sandy loam soils where it can dig more easily for its prey. Occasionally found in open chaparral (with less than 50% plant cover) and riparian zones.	No
Thamnophis hammondii two-striped garter snake	Fed: None CA: SSC	Occurs in or near permanent fresh water, often along streams with rocky beds and riparian growth up to 7,000 feet in elevation.	No
Vireo bellii pusillus least Bell's vireo	Fed: **END** CA: **END**	Primarily occupy Riverine riparian habitat that typically feature dense cover within 1-2 meters of the ground and a dense, stratified canopy. Typically it is associated with southern willow scrub, cottonwood-willow forest, mule fat scrub, sycamore alluvial woodlands, coast live oak riparian forest, arroyo willow riparian forest, or mesquite in desert localities. It uses habitat which is limited to the immediate vicinity of water courses, 2,000 feet elevation in the interior.	No
Special-Status Plant Species			
Ambrosia monogyra singlewhorl burrobush	Fed: None CA: None CNPS: 2B.2	Found in sandy soils within chaparral and Sonoran desert scrub habitat. Found at elevations ranging from 33 to 1,640 feet. Blooming period is from August to November.	No

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**
Arenaria paludicola marsh sandwort	Fed: **END** CA: **END** CNPS: 1B.1	Grows mainly in wetlands and freshwater marshes in arid climates. The plant can grow in saturated acidic bog soils and soils that are sandy with a high organic content. Found at elevations ranging from 33 to 558 feet. Blooming period is from May to August.	No
Berberis nevinii Nevin's barberry	Fed: **END** CA: **END** CNPS: 1B.1	Grows in chaparral, cismontane woodland, coastal scrub, and riparian scrub. Usually found on steep, north facing slopes or in low grade sandy washes. Found at elevations ranging from 197 to 3,904 feet. Blooming period ranges from March to June.	No
Brodiaea filifolia thread-leaved brodiaea	Fed: **THR** CA: **END** CNPS: 1B.1	Often found in clay soils within openings of chaparral, cismontane woodland, coastal scrub, playas, vernal pools, valley and foothill grassland habitats. Found at elevations ranging from 82 to 3,675 feet. Blooming period ranges from March to June.	No
Calochortus catalinae Catalina mariposa-lily	Fed: None CA: None CNPS: 4.2	Grows in chaparral, cismontane woodland, coastal scrub, valley and foothill grassland. Found at elevations ranging from 49 to 2,297 feet. Blooming period is from February to June.	No
Calochortus palmeri* var. *palmeri Palmer's mariposa-lily	Fed: None CA: None CNPS: 1B.2	Occurs in meadows and seeps, chaparral, and lower montane coniferous forest in vernally moist places. Found at elevations ranging from 3,281 to 7,841 feet. Blooming period is from April to July.	No
Calochortus plummerae Plummer's mariposa-lily	Fed: None CA: None CNPS: 4.2	Prefers openings in chaparral, foothill woodland, coastal sage scrub, valley and foothill grasslands, cismontane woodland, lower montane coniferous forest and yellow pine forest. Often found on dry, rocky slopes and soils and brushy areas. Can be very common after a fire. From 328 to 5,577 feet in elevation. Blooming period is from May to July.	No
Castilleja lasiorhyncha San Bernardino Mountains owl's-clover	Fed: None CA: None CNPS: 1B.2	Found in chaparral, riparian woodland, pebble (pavement) plain, upper montane coniferous forest, meadows and seeps habitats. Found at elevations ranging from 4,265 to 7,841 feet. Blooming period is from May to August.	No
Centromadia pungens* ssp. *laevis smooth tarplant	Fed: None CA: None CNPS: 1B.1	Occurs in alkaline soils within chenopod scrub, meadows and seeps, playas, riparian woodland, and valley and foothill grassland habitats. Grows in elevation from 0 to 2,100 feet. Blooming period ranges from April to September.	No
Chloropyron maritimum* ssp. *maritimum salt marsh bird's-beak	Fed: **END** CA: **END** CNPS: 1B.2	Upper terraces and higher edges of coastal salt marshes where tidal inundation is periodic. Found at elevations ranging from 0 to 98 feet. Blooming period is from May to October.	No
Chorizanthe parryi* var. *parryi Parry's spineflower	Fed: None CA: None CNPS: 1B.1	Occurs on sandy and/or rocky soils in chaparral, coastal sage scrub, and sandy openings within alluvial washes and margins. Found at elevations ranging from 951 to 3,773 feet. Blooming period is from April to June.	No
Chorizanthe xanti var. leucotheca white-bracted spineflower	Fed: None CA: None CNPS: 1B.2	Found in sandy or gravelly soils within coastal scrub (alluvial fans), Mojavean desert scrub, pinyon and juniper woodland habitats. Found at elevations ranging from 984 to 3,937 feet. Blooming period is from April to June.	No

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**
Cryptantha incana Tulare cryptantha	Fed: None CA: None CNPS: 1B.3	Occurs in lower montane coniferous forest (gravelly or rocky). Found at elevations ranging from 4,692 to 7,054 feet above msl. Blooming period is from June to August.	No
Dodecahema leptoceras slender-horned spineflower	Fed: **END** CA: **END** CNPS: 1B.1	Chaparral, coastal scrub (alluvial fan sage scrub). Flood deposited terraces and washes. Found at elevations ranging from 1,181 to 2,690 feet. Blooming period is from April to June.	No
Eriastrum densifolium* ssp. *sanctorum Santa Ana River woollystar	Fed: **END** CA: **END** CNPS: 1B.1	Found in sandy soil in association with mature alluvial scrub. Ideal habitat appears to be a terrace or bench that receives overbank deposits every 50 to 100 years. Cryptogamic crusts are frequently present in occupied areas. Found at elevations ranging from 299 to 2,001 feet. Blooming period is from April to September.	No
Eriophyllum lanatum* var. *obovatum southern Sierra woolly sunflower	Fed: None CA: None CNPS: 4.3	Occurs in sandy loam soals within lower and upper montane coniferous forests. Found at elevations ranging from 3,655 to 8,202 feet. blooming period is from June to July.	No
Fimbristylis thermalis hot springs fimbristylis	Fed: None CA: None CNPS: 2B.2	Habitat includes meadows and seeps (alkaline, near hot springs). Found at elevations ranging from 361 to 4,396 feet. Blooming period is from July to September.	No
Frasera neglecta pine green-gentian	Fed: None CA: None CNPS: 4.3	Found in lower montane coniferous forest, upper montane coniferous forest, pinyon and juniper woodland habitats. Found at elevations ranging from 4,593 to 8,202 feet. Blooming period is from May to July.	No
Galium jepsonii Jepson's bedstraw	Fed: None CA: None CNPS: 4.3	Found in granitic, rocky or gravelly soils within lower montane coniferous forest and upper montane coniferous forest habitats. Found at elevations ranging from 5,052 to 8,202 feet above msl. Blooming period is from July to August.	No
Galium johnstonii Johnston's bedstraw	Fed: None CA: None CNPS: 4.3	Found in granitic, rocky or gravelly soils within lower montane coniferous forest and upper montane coniferous forest habitats. Found at elevations ranging from 5,052 to 8,202 feet. Blooming period is from July to August.	No
Horkelia cuneata var. puberula Mesa horkelia	Fed: None CA: None CNPS: 1B.1	Occurs on sandy or gravelly soils in chaparral, woodlands, and coastal scrub plant communities. Found at elevations ranging from 230 to 2,657 feet. Blooming period is from February to September.	No
Imperata brevifolia California satintail	Fed: None CA: None CNPS: 2B.1	Grows in chaparral, coastal scrub, mojavean desert scrub, riparian scrub, and meadows and seeps. Found at elevations ranging from 0 to 3,986 feet. Blooming period is from September to May.	No
Juglans californica southern California black walnut	Fed: None CA: None CNPS: 4.2	Found in chaparral, cismontane woodland, coastal scrub, and riparian woodland habitats. Found at elevations ranging from 164 to 2,953 feet. Blooming period is from March to August.	No
Juncus duranii Duran's rush	Fed: None CA: None CNPS: 4.3	Habitats include lower and upper montane coniferous forests, meadows and seeps. Found at elevations ranging from 5,801 to 9,199 feet above msl. Blooming period is from July to August.	No

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**
Lilium humboldtii* ssp. *ocellatum ocellated humboldt lily	Fed: None CA: None CNPS: 4.2	Found in openings within chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, and riparian woodland habitats. Found at elevations ranging from 98 to 5,906 feet in elevation above msl. Blooming period is from March to August.	No
Lilium parryi lemon lily	Fed: None CA: None CNPS: 1B.2	Prefers lower montane coniferous forest, riparian forests, upper montane coniferous forests, meadows and seeps. Found at elevations ranging from 4,003 to 9,006 feet. Blooming period is from July to August.	No
Lycium parishii Parish's desert-thorn	Fed: None CA: None CNPS: 2B.3	Habitats include coastal scrub and Sonoran desert scrub. Found at elevations ranging from 443 to 3,281 feet. Blooming period is from March to April.	No
Malacothamnus parishii Parish's bush-mallow	Fed: None CA: None CNPS: 1A	Species is presumed extinct. Habitats include coastal scrub and chaparral. Found at elevations ranging from 1,000 to 1,495 feet. Blooming period is from June to July.	No
Monardella saxicola rock monardella	Fed: None CA: None CNPS: 4.2	Found in rocky, usually serpentinite, soils within closed-cone coniferous forest, chaparral, and lower montane coniferous forest habitats. Found at elevations ranging from 1,640 to 5,906 feet. Blooming period is from June to September.	No
Muhlenbergia californica California muhly	Fed: None CA: None CNPS: 4.3	Found in chaparral, coastal scrub, lower montane coniferous forest, meadows and seeps. Only known to occur in the San Bernardino Mountains. Found at elevations ranging from 328 to 6,562 feet. Blooming period is from June to September.	No
Opuntia basilaris* var. *brachyclada short-joint beavertail	Fed: None CA: None CNPS: 1B.2	Occurs in chaparral, Joshua tree woodland, Mojavean desert scrub, and pinyon and juniper woodlands. Found at elevations ranging from 1,394 to 5,905 feet. Blooming period typically ranges from April to June, occasionally extending through August.	No
Pickeringia montana var. tomentosa woolly chaparral pea	Fed: None CA: None CNPS: 4.3	Found in gabbroic, granitic, clay soils in chaparral habitats. Found at elevations ranging from 0 to 5,557 feet. Blooming period is from May to August.	No
Quercus durata* var. *gabrielensis San Gabriel oak	Fed: None CA: None CNPS: 4.2	Grows in chaparral and cismontane woodland habitats. Found at elevations ranging from 1,476 to 3,280 feet. Blooming period is from April to May.	No
Schoenus nigricans black bog-rush	Fed: None CA: None CNPS: 2B.2	Grows within marshes and swamps (often alkaline). Found at elevations ranging from 492 to 6,562 feet. Blooming period is from August to September.	No
Senecio astephanus San Gabriel ragwort	Fed: None CA: None CNPS: 4.3	Grows in chaparral, cismontane woodland, and coastal scrub habitat. Found at elevations ranging from 49 to 2,625 feet. Blooming period is from January to April.	No
Streptanthus bernardinus Laguna Mountains jewelflower	Fed: None CA: None CNPS: 4.3	Grows in chaparral and lower montane coniferous forest on clay or decomposed granite soils. It is sometimes found in disturbed areas such as streamsides or roadcuts. From 4,724 to 8,202 feet in elevation. Blooming period is from May to August.	No

Scientific Name Common Name	**Status**	**Habitat**	**Observed Onsite**
Streptanthus campestris southern jewelflower	Fed: None CA: None CNPS: 1B.3	Found in rocky habitats within chaparral, lower montane coniferous forest, pinyon and juniper woodland. Found at elevations ranging from 2,953 to 7,546 feet. Blooming period is from April to July.	No
Symphyotrichum defoliatum San Bernardino aster	Fed: None CA: None CNPS: 1B.2	Grows in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland (vernally mesic). Can be found growing near ditches, streams, and springs within these habitats. Found at elevations ranging from 7 to 6,693 feet. Blooming period is from July to November.	No
Special-Status Plant Communities			
Riversidean Alluvial Fan Sage Scrub	CDFW Sensitive Habitat	Occur within broad washes of sandy alluvial drainages that carry rainfall runoff sporadically in winter and spring, but remain relatively dry through the remainder of the year. Is restricted to drainages and floodplains with very sandy substrates that have a dearth of decomposed plant material. These areas do not develop into riparian woodland or scrub due to the limited water resources and scouring by occasional floods.	Yes
Southern Riparian Forest	CDFW Sensitive Habitat	Dense riparian forests found along streams and rivers. Characteristic plant species include western sycamore, cottonwood, and many other wetland plants.	No
Southern Sycamore Alder Riparian Woodland	CDFW Sensitive Habitat	Below 2,000 meters in elevation, sycamore and alder often occur along seasonally-flooded banks; cottonwoods and willows also are often present. Poison-oak, mugwort, elderberry and wild raspberry may be present in the understory.	No

U.S. Fish and Wildlife Service (USFWS) - Federal
END - Federally Endangered
THR - Federally Threatened

California Department of Fish and Wildlife (CDFW) - California
END - State Endangered
CEND - State Candidate Endangered
SSC - Species of Special Concern
WL - Watch List
FP - Fully Protected

California Native Plant Society (CNPS)
California Rare Plant Rank
1A Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B Plants Rare, Threatened, or Endangered in California and Elsewhere
2B Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere
4 Plants of Limited Distribution – A Watch List

Threat Ranks
0.1 - Seriously threatened in California
0.2 - Moderately threatened in California
0.3 - Not very threatened in California

Attachment E

Regulations

Special status species are native species that have been afforded special legal or management protection because of concern for their continued existence. There are several categories of protection at both federal and state levels, depending on the magnitude of threat to continued existence and existing knowledge of population levels.

Federal Regulations

Endangered Species Act of 1973

Federally listed threatened and endangered species and their habitats are protected under provisions of the Federal Endangered Species Act (ESA). Section 9 of the ESA prohibits "take" of threatened or endangered species. "Take" under the ESA is defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any of the specifically enumerated conduct." The presence of any federally threatened or endangered species that are in a project area generally imposes severe constraints on development, particularly if development would result in "take" of the species or its habitat. Under the regulations of the ESA, the United States Fish and Wildlife Service (USFWS) may authorize "take" when it is incidental to, but not the purpose of, an otherwise lawful act.

Critical Habitat is designated for the survival and recovery of species listed as threatened or endangered under the ESA. Critical Habitat includes those areas occupied by the species, in which are found physical and biological features that are essential to the conservation of an ESA listed species and which may require special management considerations or protection. Critical Habitat may also include unoccupied habitat if it is determined that the unoccupied habitat is essential for the conservation of the species.

Whenever federal agencies authorize, fund, or carry out actions that may adversely modify or destroy Critical Habitat, they must consult with USFWS under Section 7 of the ESA. The designation of Critical Habitat does not affect private landowners, unless a project they are proposing uses federal funds, or requires federal authorization or permits (e.g., funding from the Federal Highway Administration or a permit from the U.S. Army Corps of Engineers (Corps)).

If USFWS determines that Critical Habitat will be adversely modified or destroyed from a proposed action, the USFWS will develop reasonable and prudent alternatives in cooperation with the federal institution to ensure the purpose of the proposed action can be achieved without loss of Critical Habitat. If the action is not likely to adversely modify or destroy Critical Habitat, USFWS will include a statement in its biological opinion concerning any incidental take that may be authorized and specify terms and conditions to ensure the agency is in compliance with the opinion.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S. Government Code [USC] 703) makes it unlawful to pursue, capture, kill, possess, or attempt to do the same to any migratory bird or part, nest, or egg of any such bird listed in wildlife protection treaties between the United States, Great Britain, Mexico, Japan, and the countries of the former Soviet Union, and authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703; 50 CFR 10, 21).

The MBTA covers the taking of any nests or eggs of migratory birds, except as allowed by permit pursuant to 50 CFR, Part 21. Disturbances causing nest abandonment and/or loss of reproductive effort (i.e., killing or abandonment of eggs or young) may also be considered "take." This regulation seeks to protect migratory birds and active nests.

In 1972, the MBTA was amended to include protection for migratory birds of prey (e.g., raptors). Six families of raptors occurring in North America were included in the amendment: Accipitridae (kites, hawks, and eagles); Cathartidae (New World vultures); Falconidae (falcons and caracaras); Pandionidae (ospreys); Strigidae (typical owls); and Tytonidae (barn owls). The provisions of the 1972 amendment to the MBTA protects all species and subspecies of the families listed above. The MBTA protects over 800 species including geese, ducks, shorebirds, raptors, songbirds and many relatively common species.

State Regulations

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) provides for the protection of the environment within the State of California by establishing State policy to prevent significant, avoidable damage to the environment through the use of alternatives or mitigation measures for projects. It applies to actions directly undertaken, financed, or permitted by State lead agencies. If a project is determined to be subject to CEQA, the lead agency will be required to conduct an Initial Study (IS); if the IS determines that the project may have significant impacts on the environment, the lead agency will subsequently be required to write an Environmental Impact Report (EIR). A finding of non-significant effects will require either a Negative Declaration or a Mitigated Negative Declaration instead of an EIR. Section 15380 of the CEQA Guidelines independently defines "endangered" and "rare" species separately from the definitions of the California Endangered Species Act (CESA). Under CEQA, "endangered" species of plants or animals are defined as those whose survival and reproduction in the wild are in immediate jeopardy, while "rare" species are defined as those who are in such low numbers that they could become endangered if their environment worsens.

California Endangered Species Act (CESA)

In addition to federal laws, the state of California implements the CESA which is enforced by CDFW. The CESA program maintains a separate listing of species beyond the FESA, although the provisions of each act are similar.

State-listed threatened and endangered species are protected under provisions of the CESA. Activities that may result in "take" of individuals (defined in CESA as; "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") are regulated by CDFW. Habitat degradation or modification is not included in the definition of "take" under CESA. Nonetheless, CDFW has interpreted "take" to include the destruction of nesting, denning, or foraging habitat necessary to maintain a viable breeding population of protected species.

The State of California considers an endangered species as one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is considered as one present in such small numbers throughout its range that it is likely to become an endangered species in the near future in the

absence of special protection or management. A rare species is one that is considered present in such small numbers throughout its range that it may become endangered if its present environment worsens. State threatened and endangered species are fully protected against take, as defined above.

The CDFW has also produced a species of special concern list to serve as a species watch list. Species on this list are either of limited distribution or their habitats have been reduced substantially, such that a threat to their populations may be imminent. Species of special concern may receive special attention during environmental review, but they do not have formal statutory protection. At the federal level, USFWS also uses the label species of concern, as an informal term that refers to species which might be in need of concentrated conservation actions. As the Species of Concern designated by USFWS do not receive formal legal protection, the use of the term does not necessarily ensure that the species will be proposed for listing as a threatened or endangered species.

Fish and Game Code

Fish and Game Code Sections 3503, 3503.5, 3511, and 3513 are applicable to natural resource management. For example, Section 3503 of the Code makes it unlawful to destroy any birds' nest or any birds' eggs that are protected under the MBTA. Further, any birds in the orders Falconiformes or Strigiformes (Birds of Prey, such as hawks, eagles, and owls) are protected under Section 3503.5 of the Fish and Game Code which makes it unlawful to take, possess, or destroy their nest or eggs. A consultation with CDFW may be required prior to the removal of any bird of prey nest that may occur on a project site. Section 3511 of the Fish and Game Code lists fully protected bird species, where the CDFW is unable to authorize the issuance of permits or licenses to take these species. Pertinent species that are State fully protected by the State include golden eagle (*Aquila chrysaetos*) and white-tailed kite (*Elanus leucurus*). Section 3513 of the Fish and Game Code makes it unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA.

Native Plant Protection Act

Sections 1900–1913 of the Fish and Game Code were developed to preserve, protect, and enhance Rare and Endangered plants in the state of California. The act requires all state agencies to use their authority to carry out programs to conserve Endangered and Rare native plants. Provisions of the Native Plant Protection Act prohibit the taking of listed plants from the wild and require notification of the CDFW at least ten days in advance of any change in land use which would adversely impact listed plants. This allows the CDFW to salvage listed plant species that would otherwise be destroyed.

California Native Plant Society Rare and Endangered Plant Species

Vascular plants listed as rare or endangered by the CNPS, but which have no designated status under FESA or CESA are defined as follows:

California Rare Plant Rank

1A- Plants Presumed Extirpated in California and either Rare or Extinct Elsewhere

1B- Plants Rare, Threatened, or Endangered in California and Elsewhere

2A- Plants Presumed Extirpated in California, But More Common Elsewhere

2B- Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

3- Plants about Which More Information is Needed - A Review List

4- Plants of Limited Distribution - A Watch List

Threat Ranks

.1- Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)

.2- Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)

.3- Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known).

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Branch regulates activities pursuant to Section 404 of the Federal Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. Of the State agencies, the CDFG regulates activities under the Fish and Game Code Section 1600-1616, and the Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

Federal Regulations

Section 404 of the Clean Water Act

In accordance with the Revised Definition of "Waters of the United States" (March 20, 2023), "waters of the United Sates" are defined as follows:

> The ''waters of the United States'' are defined in paragraph (a) of this rule:
>
> (1) traditional navigable waters, the territorial seas, and interstate waters;
>
> (2) impoundments of ''waters of the United States'';
>
> (3) tributaries to traditional navigable waters, the territorial seas, interstate waters, or impoundments when the tributaries meet either the relatively permanent standard or the significant nexus standard (''jurisdictional tributaries'');
>
> (4) wetlands adjacent to traditional navigable waters; wetlands adjacent to and with a continuous surface connection to relatively permanent paragraph impoundments or to jurisdictional tributaries when the jurisdictional tributaries meet the relatively permanent standard; and wetlands adjacent to impoundments or jurisdictional tributaries when the wetlands meet the significant nexus standard (''jurisdictional adjacent wetlands''); and
>
> (5) intrastate lakes and ponds, streams, or wetlands not identified in (1) through (4) above that meet either the relatively permanent standard or the significant nexus standard.

The ''relatively permanent standard'' means relatively permanent, standing or continuously flowing waters connected to traditional navigable waters, and waters with a continuous surface connection to such relatively permanent waters or to traditional navigable waters. The ''significant nexus standard'' means waters that, either alone or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of traditional navigable waters, the territorial seas, or interstate waters.

Section 401 of the Clean Water Act

Pursuant to Section 401 of the CWA, any applicant for a federal license or permit to conduct any activity which may result in any discharge to waters of the United States must provide certification from the State or Indian tribe in which the discharge originates. This certification provides for the protection of the physical, chemical, and biological integrity of waters, addresses impacts to water quality that may result from issuance of federal permits, and helps insure that federal actions will not violate water quality standards of the State or Indian tribe. In California, there are nine Regional Water Quality Control Boards (Regional Board) that issue or deny certification for discharges to waters of the United States and waters of the State, including wetlands, within their geographical jurisdiction. The State Water Resources Control

Board assumed this responsibility when a project has the potential to result in the discharge to waters within multiple Regional Boards.

State Regulations

Fish and Game Code

Fish and Game Code Sections 1600 et. seq. establishes a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

Fish and Game Code Section 1602 requires any person, state, or local governmental agency or public utility to notify the CDFW before beginning any activity that will do one or more of the following:

(1) substantially obstruct or divert the natural flow of a river, stream, or lake;
(2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or
(3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State. CDFW's regulatory authority extends to include riparian habitat (including wetlands) supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, the CDFW takes jurisdiction to the top of bank of the stream or to the outer limit of the adjacent riparian vegetation (outer drip line), whichever is greater. Notification is generally required for any project that will take place in or in the vicinity of a river, stream, lake, or their tributaries. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation. A Section 1602 Streambed Alteration Agreement would be required if impacts to identified CDFW jurisdictional areas occur.

Porter Cologne Act

The California *Porter-Cologne Water Quality Control Act* gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Act has become an important tool in the post SWANCC and Rapanos regulatory environment, with respect to the state's authority over isolated and insignificant waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include fill discharged into water bodies.

APPENDIX D

Cultural Resources Assessment (BRC Consulting LLC – 2021)

CULTURAL RESOURCES ASSESSMENT

APNS 0262-051-45 and 0262-051-47

Devore, Unincorporated San Bernardino, California

Prepared for:

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Prepared by:

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Project No. EMT2105

National Archaeological Data Base Information:
Type of Study: Cultural Resources Assessment/Inventory
Resources Recorded: None
Keywords: Devore, San Bernardino
USGS Quadrangle: 7.5-minute *San Bernardino North, California* (1988)

BCRCONSULTING LLC

November 12, 2021

MANAGEMENT SUMMARY

BCR Consulting LLC (BCR Consulting) is under contract to ELMT Consulting to conduct a Cultural Resources Assessment of Assessor Parcel Numbers (APNs) 0262-051-45 and 0262-051-47 (the project) located in the unincorporated community of Devore, San Bernardino County, California. Tasks completed for the scope of work include a cultural resources records search, reconnaissance-level pedestrian cultural resources survey, Sacred Lands File search with the Native American Heritage Commission, and paleontological resources overview. These tasks were performed in partial fulfillment of California Environmental Quality Act (CEQA) requirements. The records search revealed that 25 cultural resource studies have taken place within one half-mile of the project site, one of which assessed a portion of the project site. Seven cultural resources have been identified within a one half-mile radius of the project site. No cultural resources have been previously recorded within its boundaries.

During the field survey, BCR Consulting archaeologists did not identify any cultural resources, including prehistoric or historic archaeological sites or historic-period buildings, within the project boundaries. As a result BCR Consulting recommends that no additional cultural resources work or monitoring is necessary for proposed project activities. However, if any cultural resources are encountered during project-related ground-disturbing activities, the developer shall retain a qualified archaeologist to assess and evaluate the find.

If human remains are encountered during the undertaking, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC.

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INTRODUCTION

BCR Consulting LLC (BCR Consulting) is under contract to ELMT Consulting to conduct a Cultural Resources Assessment of Assessor Parcel Numbers (APNs) 0262-051-45 and 0262-051-47 (the project) located in the unincorporated community of Devore, San Bernardino County, California. The project site is located in a non-sectioned portion of Township 1 North, Range 5 West, San Bernardino Baseline and Meridian. It is depicted on the United States Geological Survey (USGS) *San Bernardino North, California* (1988) 7.5-minute topographic quadrangle (Figure 1).

NATURAL SETTING

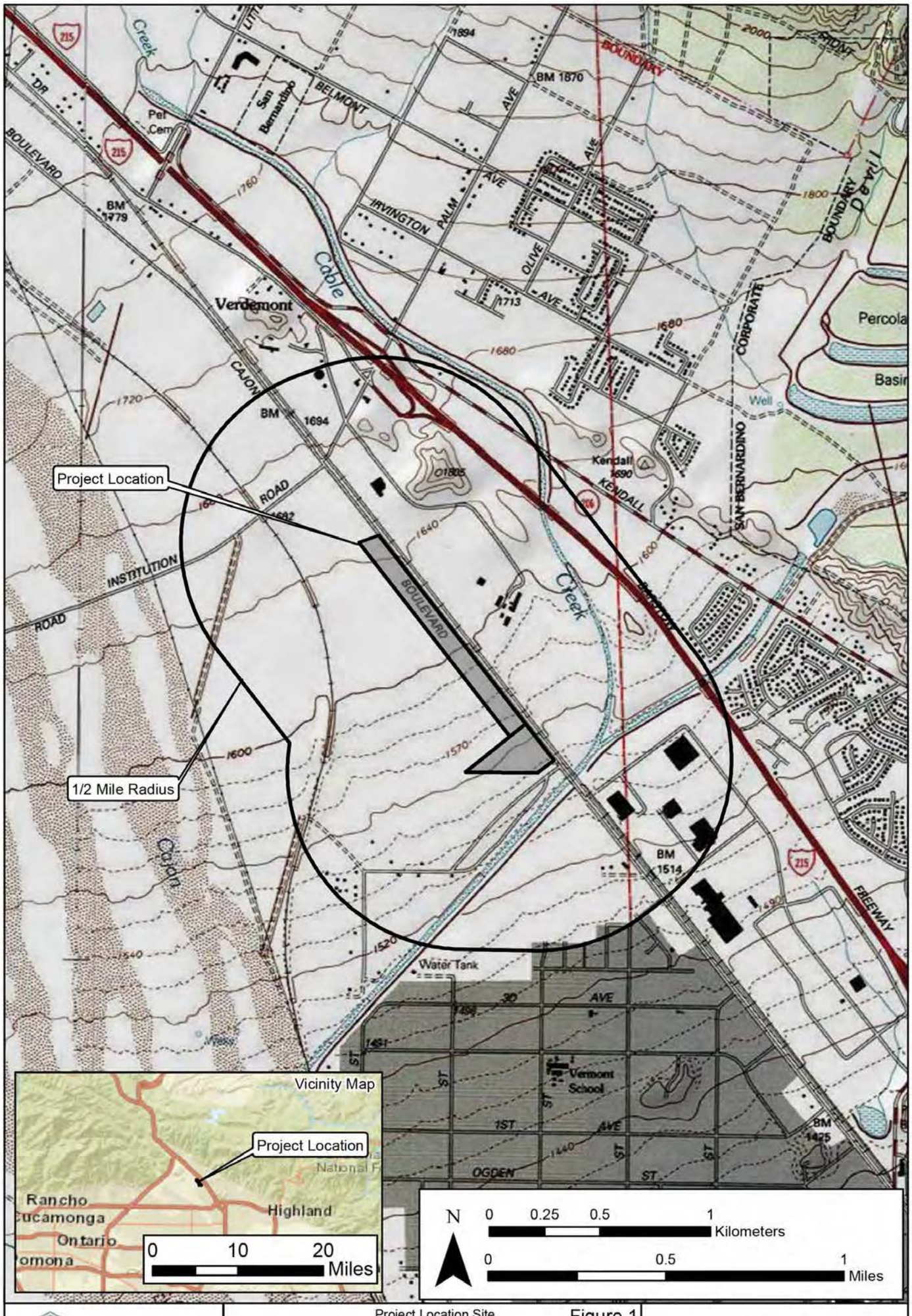
The elevation of the project site ranges from approximately 1550-1650 feet above mean sea level (AMSL). It has been subject to disturbances related to surface erosion (sheet washing) and grading for construction and maintenance of adjacent streets and a railroad alignment. The project site sediments naturally include alluvial-fan deposits derived from the San Gabriel Mountains (Morton and Matti 2001). The current study has not yielded any evidence that such sediments have produced raw materials used in prehistoric tool manufacture. Local rainfall ranges from 5 to 15 inches annually (Jaeger and Smith 1971:36-37). The project has a southeasterly aspect with a gradual slope (USGS 19896).

The following description of plant communities has been provided by Element Consulting and Lockhart & Associates. Four (4) plant communities were observed within the boundaries of the project site during the habitat assessment: highly disturbed and degraded Riversidean alluvial fan sage scrub (RAFSS), buckwheat scrub, non-native grassland, and ornamental. In addition, the project site contains a land cover type that would be classified as disturbed. Please see Lightfoot and Parrish (2009) for prehistoric use of local vegetation communities.

CULTURAL SETTING

Prehistoric Context

The local prehistoric cultural setting has been organized into many chronological frameworks (see Warren and Crabtree 1986; Bettinger and Taylor 1974; Lanning 1963; Hunt 1960; Wallace 1958, 1962, 1978; Campbell and Campbell 1935), although there is no definitive sequence for the region. The difficulties in establishing cultural chronologies for western San Bernardino County are a function of its enormous size and the small amount of archaeological excavations conducted there. Moreover, throughout prehistory many groups have occupied the area and their territories often overlap spatially and chronologically resulting in mixed artifact deposits. Due to dry climate and capricious geological processes, these artifacts rarely become integrated in-situ. Lacking a milieu hospitable to the preservation of cultural midden, local chronologies have relied upon temporally diagnostic artifacts, such as projectile points, or upon the presence/absence of other temporal indicators, such as groundstone. Such methods are instructive, but can be limited by prehistoric occupants' concurrent use of different artifact styles, or by artifact re-use or re-sharpening, as well as researchers' mistaken diagnosis, and other factors (see Flenniken 1985; Flenniken and Raymond 1986; Flenniken and Wilke 1989). Recognizing the shortcomings of comparative temporal indicators, this study recommends review of Warren and Crabree (1986), who have drawn upon this method to produce a commonly cited and relatively comprehensive chronology.



BCRCONSULTING LLC

Project Location Site
Assessor Parcel Nos. 0262-051-45-0-000 and 0262-051-47-0-000 Project
Reference: ESRI; USGS Quad: San Bernardino North, California (1988)

Figure 1

ELMT Consulting

Ethnography

Although no prehistoric sites have been locally recorded, in general the project site is situated at an ethnographic nexus peripherally occupied by the Gabrielino and Serrano. Each group consisted of semi-nomadic hunter-gatherers who spoke a variation of the Takic language subfamily. Individual ethnographic summaries are provided below.

Gabrielino. The Gabrielino probably first encountered Europeans when Spanish explorers reached California's southern coast during the 15th and 16th centuries (Bean and Smith 1978; Kroeber 1925). The first documented encounter, however, occurred in 1769 when Gaspar de Portola's expedition crossed Gabrielino territory (Bean and Smith 1978). Other brief encounters took place over the years, and are documented in McCawley 1996 (citing numerous sources). The Gabrielino name has been attributed by association with the Spanish mission of San Gabriel, and refers to a subset of people sharing speech and customs with other Cupan speakers (such as the Juaneño/Luiseño/Ajachemem) from the greater Takic branch of the Uto-Aztecan language family (Bean and Smith 1978). Gabrielino villages occupied the watersheds of various rivers (locally including the Santa Ana) and intermittent streams. Chiefs were usually descended through the male line and often administered several villages. Gabrielino society was somewhat stratified and is thought to have contained three hierarchically ordered social classes which dictated ownership rights and social status and obligations (Bean and Smith 1978:540-546). Plants utilized for food were heavily relied upon and included acorn-producing oaks, as well as seed-producing grasses and sage. Animal protein was commonly derived from rabbits and deer in inland regions, while coastal populations supplemented their diets with fish, shellfish, and marine mammals (Boscana 1933, Heizer 1968, Johnston 1962, McCawley 1996). Dog, coyote, bear, tree squirrel, pigeon, dove, mud hen, eagle, buzzard, raven, lizards, frogs, and turtles were specifically not utilized as a food source (Kroeber 1925:652).

Serrano. Kroeber (1925) applied the generic term “Serrano” to four groups, each with distinct territories: the Kitanemuk, Tataviam, Vanyume, and Serrano. Only one group, in the San Bernardino Mountains and West-Central Mojave Desert, ethnically claims the term Serrano. Bean and Smith (1978) indicate that the Vanyume, an obscure Takic population, was found along the Mojave River at the time of Spanish contact. The Kitanemuk lived to the north and west, while the Tataviam lived to the west. All may have used the western San Bernardino County area seasonally. Serrano villages consisted of small collections of willow-framed domed structures situated near reliable water sources. A lineage leader administered laws and ceremonies from a large ceremonial house centrally located in most villages. Local Serrano relied heavily on acorns and piñon nuts for subsistence, although roots, bulbs, shoots, and seeds supplemented these. When available, game animals commonly included deer, mountain sheep, antelope, rabbits, small rodents, and various birds –particularly quail (Bean and Smith 1978:571).

History

Historic-era California is generally divided into three periods: the Spanish or Mission Period (1769 to 1821), the Mexican or Rancho Period (1821 to 1848), and the American Period (1848 to present).

Spanish Period. The first European to pass through the area is thought to be a Spaniard called Father Francisco Garces. Having become familiar with the area, Garces acted as a guide to Juan Bautista de Anza, who had been commissioned to lead a group across the

desert from a Spanish outpost in Arizona to set up quarters at the Mission San Gabriel in 1771 near what today is Pasadena (Beck and Haase 1974). Garces was followed by Alta California Governor Pedro Fages, who briefly explored the region in 1772. Searching for San Diego Presidio deserters, Fages had traveled through Riverside to San Bernardino, crossed over the mountains into the Mojave Desert, and then journeyed westward to the San Joaquin Valley (Beck and Haase 1974).

Mexican Period. In 1821, Mexico overthrew Spanish rule and the missions began to decline. By 1833, the Mexican government passed the Secularization Act, and the missions, reorganized as parish churches, lost their vast land holdings, and released their neophytes (Beattie and Beattie 1974).

American Period. The American Period, 1848–Present, began with the Treaty of Guadalupe Hidalgo. In 1850, California was accepted into the Union of the United States primarily due to the population increase created by the Gold Rush of 1849. The cattle industry reached its greatest prosperity during the first years of the American Period. Mexican Period land grants had created large pastoral estates in California, and demand for beef during the Gold Rush led to a cattle boom that lasted from 1849–1855. However, beginning about 1855, the demand for beef began to decline due to imports of sheep from New Mexico and cattle from the Mississippi and Missouri Valleys. When the beef market collapsed, many California ranchers lost their ranchos through foreclosure. A series of disastrous floods in 1861–1862, followed by a significant drought further diminished the economic impact of local ranching. This decline combined with ubiquitous agricultural and real estate developments of the late 19th century, set the stage for diversified economic pursuits that have continued to proliferate to this day (Beattie and Beattie 1974; Cleland 1941).

PERSONNEL

David Brunzell, M.A., RPA acted as the Project Manager and Principal Investigator for the current study and compiled the technical report. South Central Coastal Information Center (SCCIC) staff completed the cultural resources records search at the SCCIC facility in Fullerton, California. BCR Consulting Archaeological Crew Chief Joseph Orozco and BCR Consulting Staff Historian/Field Technician George Brentner, B.A. completed the pedestrian field survey.

METHODS

Records Search

Prior to fieldwork, an archaeological records search was conducted at the SCCIC. This included a review of all recorded historic and prehistoric cultural resources, as well as a review of known cultural resources, and survey and excavation reports generated from projects completed within one half-mile of the project site. In addition, a review was conducted of the National Register of Historic Places (National Register), the California Register of Historical Resources (California Register), and documents and inventories from the California Office of Historic Preservation including the lists of California Historical Landmarks, California Points of Historical Interest, Listing of National Register Properties, and the Inventory of Historic Structures.

Field Survey

An archaeological pedestrian field survey of the project site was conducted on May 27, 2021. The survey was conducted by walking parallel transects spaced approximately 15 meters apart across 100 percent of the project site. All soil exposures were carefully inspected for evidence of cultural resources. Vegetation was moved aside and surface shovel scrapes were performed at regular intervals to inspect areas of low-visibility for evidence of cultural resources.

RESULTS

Records Search

Data from the SCCIC revealed that 25 cultural resource studies have taken place within one half-mile of the project site, one of which assessed a portion of the project site. Seven cultural resources have been identified within a one half-mile radius of the project site. No cultural resources have been previously recorded within its boundaries. The records search is summarized as follows:

Table A. Cultural Resources and Reports Located Within One Half-Mile of the Project Site

USGS 7.5 Min. Quad.	Cultural Resources Within One Half-Mile of Project Site	Studies Within One Half-Mile of Project Site
San Bernardino North, Calif. (1996)	P-36-002910: Historic Route 66 (Adjacent East) P-36-006793: Atchison, Topeka, Santa Fe RR (Adjacent E) P-36-010315: Historic-period Trans line (1/2 Mile W) P-36-020646: Historic-period bottle scatter (1/8 Mile NE) P-36-021325: Historic-period Institution Road (1/4 Mile NW) P-36-021326: Historic-period railroad bridge (1/4 Mile NW) P-36-026792: Historic-period can scatter (1/8 Mile N)	SB-106-0713, 1285, 1821, 1734, 1870, 1958, 2416, 2712, 2853, 3645, 3711, 3919, 3968, 5897, 6059, 6291, 6446, 6808, 6947, 6994*, 7622, 7625, 7630, 7636, 7637

*Previously assessed a portion of the project site.

Field Survey

During the field survey, Mr. Orozco and Mr. Brentner carefully inspected the project site, and identified no cultural resources within its boundaries. Surface visibility was approximately 60 percent. Ground disturbances were moderate to severe and resulted from a variety of natural and artificial factors, including sheetwashing as well as excavation for construction and maintenance of adjacent roads and railroads.

RECOMMENDATIONS

BCR Consulting conducted a Cultural Resources Assessment of the proposed project, pursuant to CEQA. The records search and field survey did not identify any cultural resources (including prehistoric or historic archaeological sites or historic buildings) within the project site. Furthermore, records search results combined with surface conditions have failed to indicate sensitivity for buried cultural resources. Based on these results, BCR Consulting recommends that no additional cultural resources work or monitoring are necessary for proposed project activities. However, if any cultural resources are encountered during project-related ground-disturbing activities, the developer shall retain a qualified archaeologist to assess and evaluate the find.

If human remains are encountered during the undertaking, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendant (MLD). With the permission of the landowner or his/her authorized representative, the MLD may inspect the site of the discovery. The MLD shall complete the inspection within 48 hours of notification by the NAHC.

REFERENCES

Avina, Rose Hollenbaugh
1932 *Spanish and Mexican Land Grants in California.* Unpublished Master's Thesis, Universiy of California, Berkeley.

Bean, Lowell John, and Charles Smith
1978 *California*, edited by R.F. Heizer. Handbook of North American Indians, Vol. 8, W.C. Sturtevant, general editor, Smithsonian Institution. Washington, D.C.

Beattie, George W., and Helen P. Beattie
1974 *Heritage of the Valley: San Bernardino's First Century*. Biobooks: Oakland.

Beck, Warren A., and Ynez D. Haase
1974 *Historical Atlas of California*. Oklahoma City: University of Oklahoma Press.

Bettinger, Robert L., and R.E. Taylor
1974 Suggested Revisions in Archaeological Sequences of the Great Basin and Interior Southern California. *Nevada Archaeological Survey Research Papers* 3:1-26.

Boscana, Father Geronimo
1933 *Chinigchinich: Robinson's Translation of Father Boscana's Historic Account of the Belief, Usages, Customs and Extravagancies of the Indians of this Mission of San Juan Capistrano Called Acagchemem Tribe.* Fine Arts Press, Santa Ana.

Campbell, E., and W. Campbell
1935 The Pinto Basin. *Southwest Museum Papers* 9:1-51.

Cleland, Robert Glass
1941 *The Cattle on a Thousand Hills—Southern California, 1850-80.* San Marino, California: Huntington Library.

Flenniken, J.J.
1985 Stone Tool Reduction Techniques as Cultural Markers. *Essays in Honor of Don E. Crabtree,* edited by Plew, Woods, and Pavesic. UNM Press, Albuquerque.

Flenniken, J.J. and A.W. Raymond
1986 Morphological Projectile Point Typology: Replication, Experimentation, and Technological Analysis. *American Antiquity* 51:603-614.

Flenniken, J.J. and Philip J. Wilke
1989 Typology, Technology, and Chronology of Great Basin Dart Points. *American Anthropologist* 91:149-158.

Heizer, Robert F.
1968 Introduction and Notes: *The Indians of Los Angeles County: Hugo Reid's Letters of 1852,* edited and annotated by Robert F. Heizer. Southwest Museum, Los Angeles.

Hunt, Alice P.
1960 *The Archaeology of the Death Valley Salt Pan, California.* University of Utah Anthropological Papers No. 47.

Jaeger, Edmund C., and Arthur C. Smith
1971 *Introduction to the Natural History of Southern California*. California Natural History Guides: 13. University of California Press. Los Angeles

Johnston, B.E.
1962 *California's Gabrielino Indians.* Southwest Museum, Los Angeles.

Kroeber, Alfred L.
1925 *Handbook of the Indians of California.* Bureau of American Ethnology Bulletin 78. Washington D.C.: Smithsonian Institution. Reprinted in 1976, New York: Dover.

Lanning, Edward P.
1963 The Archaeology of the Rose Spring Site (Iny-372). *University of California Publications in American Archaeology and Ethnology* 49(3):237-336.

Lightfoot, Kent G., Otis Parrish
2009 *California Indians and Their Environment, an Introduction.* University of California Press, Berkeley.

McCawley, William
1996 *The First Angelinos, The Gabrielino Indians of Los Angeles.* Malki Museum Press/Ballena Press Cooperative Publication. Banning/Novato, California.

Morton, Douglas M., and Matti, Jonathan C.
2001 *Geologic Map of the Devore 7.5' quadrangle, San Bernardino County, California*. *U.S. Geological Survey Open-File Report 01-173.* U.S.G.S., Menlo Park, California.

United States Geological Survey
1988 *San Bernardino North, California* 7.5-minute topographic quadrangle map.

Wallace, William J.
1958 Archaeological Investigation in Death Valley National Monument. *University of California Archaeological Survey Reports* 42:7-22.

1962 Prehistoric Cultural Development in the Southern California Deserts. *American Antiquity* 28(2):172-180.

1978 The Southern Valley Yokuts, and The Northern Valley Yokuts. In *Handbook of the North American Indians, Vol. 8, California,* edited by W.L. d'Azevedo, pp. 448-470. W.C. Sturtevant, General Editor. Smithsonian Institution, Washington D.C.

Warren, Claude N. and R.H. Crabtree
1986 The Prehistory of the Southwestern Great Basin. In *Handbook of the North American Indians, Vol. 11, Great Basin,* edited by W.L. d'Azevedo, pp.183-193. W.C. Sturtevant, General Editor. Smithsonian Institution, Washington D.C.

Williams, Patricia, Leah Messinger, Sarah Johnson
2008 *Habitats Alive! An Ecological Guide to California's Diverse Habitats.* California Institute for Biodiversity, Claremont, California.

APPENDIX A

PROJECT PHOTOGRAPHS



Photo 1: Project Overview (View N)



Photo 2: Project Overview (View NE)



Photo 3: Project Overview (View NE)



Photo 4: Project Overview (View N)

APPENDIX B

NATIVE AMERICAN HERITAGE COMMISSION COMMUNICATIONS

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
Merri Lopez-Keifer
Luiseño

PARLIAMENTARIAN
Russell Attebery
Karuk

COMMISSIONER
William Mungary
Paiute/White Mountain Apache

COMMISSIONER
Julie Tumamait-Stenslie
Chumash

COMMISSIONER
[Vacant]

COMMISSIONER
[Vacant]

COMMISSIONER
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EXECUTIVE SECRETARY
Christina Snider
Pomo

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
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California 95691
(916) 373-3710
nahc@nahc.ca.gov
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May 26, 2021

Nicholas Shepetuk
BCR Consulting LLC

Via Email to: nickshepetuk@gmail.com

Re: Assessor Parcel Nos. 0262-051-45-0-000 and 0262-051-47-0-000 Project, San Bernardino County

Dear Mr. Shepetuk:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive. Please contact the San Manuel Band of Mission Indians on the attached list for more information. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
San Bernardino County
5/26/2021

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
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Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

Agua Caliente Band of Cahuilla Indians
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Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393 — Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 — Gabrieleno
San Gabriel, CA, 91778
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Fax: (626) 286-1262
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Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino
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Gabrielino Tongva Indians of California Tribal Council
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Phone: (562) 761 - 6417
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Gabrielino Tongva Indians of California Tribal Council
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Gabrielino-Tongva Tribe
Charles Alvarez,
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Morongo Band of Mission Indians
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Morongo Band of Mission Indians
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abrierty@morongo-nsn.gov

Quechan Tribe of the Fort Yuma Reservation
Manfred Scott, Acting Chairman
Kw'ts'an Cultural Committee
P.O. Box 1899 — Quechan
Yuma, AZ, 85366
Phone: (928) 750 - 2516
scottmanfred@yahoo.com

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Assessor Parcel Nos. 0262-051-45-0-000 and 0262-051-47-0-000 Project, San Bernardino County.

Native American Heritage Commission
Native American Contact List
San Bernardino County
5/26/2021

Quechan Tribe of the Fort Yuma Reservation
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Yuma, AZ, 85366
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historicpreservation@quechantribe.com
Quechan

San Manuel Band of Mission Indians
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Serrano

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Cahuilla

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Serrano

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Serrano

Soboba Band of Luiseno Indians
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Cahuilla
Luiseno

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Cahuilla
Luiseno

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Assessor Parcel Nos. 0262-051-45-0-000 and 0262-051-47-0-000 Project, San Bernardino County.

APPENDIX C

PALEONTOLOGICAL OVERVIEW

WESTERN SCIENCE CENTER

BCR Consulting, LLC
Nicholas Shepetuk
505 West 8th Street
Claremont, CA 91711

May 30, 2021

Dear Mr. Shepetuk,

This letter presents the results of a record search conducted for the APN 0262-051-45-0-000 and APN 0262-051-47-0-000 Project in the city of Devore, San Bernardino County, California. The project site is located at southwest of Historic Route 66 and northwest of Road Runner Trail in am non-sectioned portion of Township 1 North, Range 5 West on the *San Bernardino North, CA USGS* 7.5 minute quadrangle.

The geologic units underlying this project are mapped entirely as alluvial fan deposits dating to the Holocene epoch (Dibblee and Minch, 2004). While Holocene alluvial units are considered to be of high preservation value, material found is unlikely to be fossil material due to the relatively modern associated dates of the deposits. However, if development requires any substantial depth of disturbance, the likelihood of reaching older Holocene or Late Pleistocene alluvial sediments would increase. The Western Science Center does not have localities within the project area or within a 1 mile radius.

While the presence of any fossil material is unlikely, if excavation activity for the APN 0262-051-45-0-000 and APN 0262-051-47-0-000 Project disturbs deeper sediment dating to the earliest parts of the Holocene or Late Pleistocene periods, the material would be scientifically significant. Excavation activity associated with the development of the project area is unlikely to be paleontologically sensitive, but caution during development should be observed.

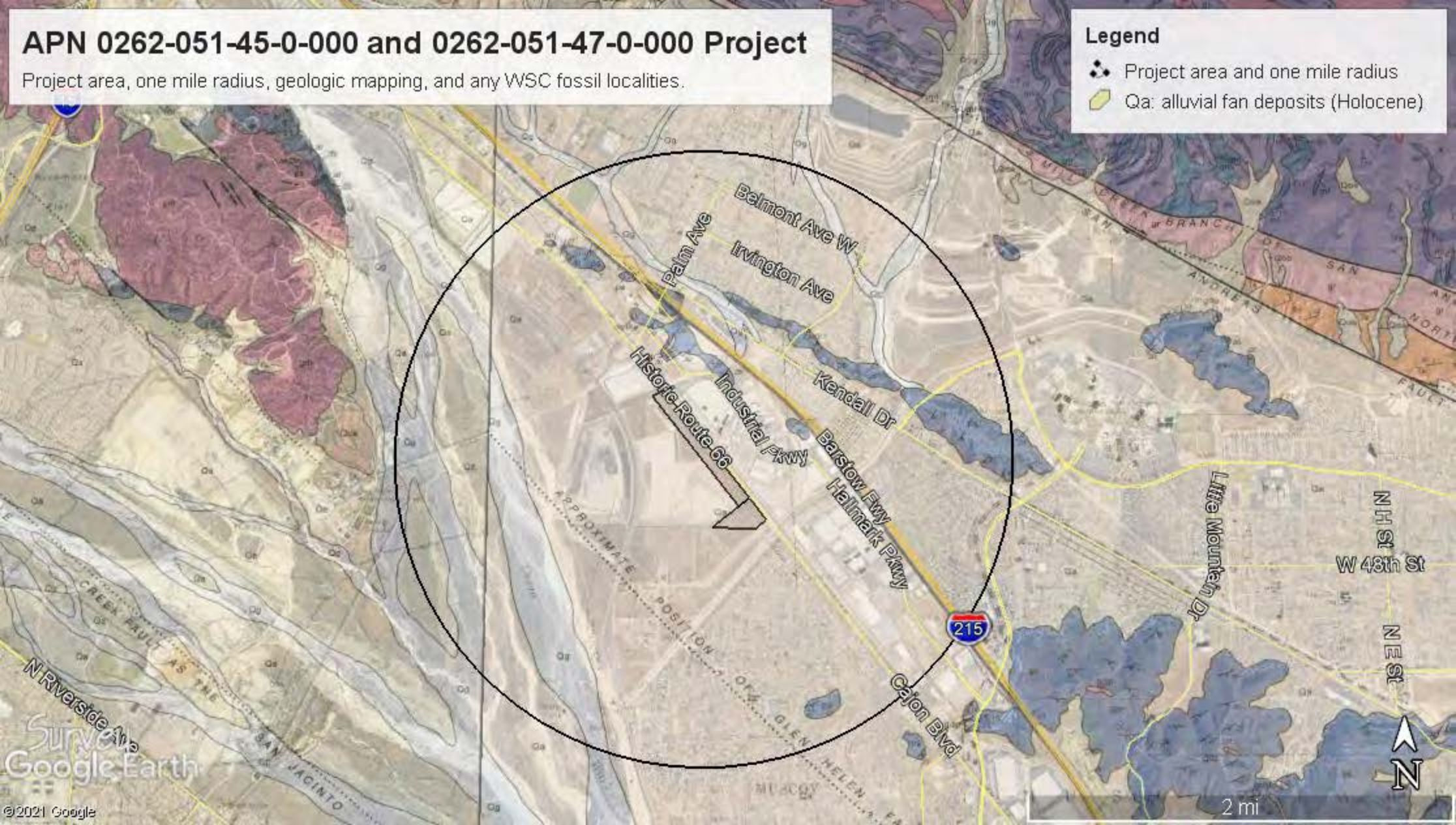
If you have any questions or would like further information, please feel free to contact me at dradford@westerncentermuseum.org

Sincerely,

Darla Radford
Collections Manager

APN 0262-051-45-0-000 and 0262-051-47-0-000 Project

Project area, one mile radius, geologic mapping, and any WSC fossil localities.



APPENDIX E

Geotechnical Evaluation(s)
(Haley & Aldrich, Inc. – 2023)

HALEY ALDRICH

www.haleyaldrich.com

PRIVILEGED AND CONFIDENTIAL
ATTORNEY WORK PRODUCT

REPORT ON

GEOTECHNICAL EVALUATION
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY CONSOLIDATION PROJECT
2400 WEST HIGHLAND AVENUE
SAN BERNARDINO, CALIFORNIA



by
Haley & Aldrich, Inc.
Walnut Creek, California

for
Harrison, Temblador, Hungerford & Guernsey LLP
Sacramento, California

File No. 0132051-005
May 2023

HALEY & ALDRICH, INC.
2033 N. Main Street
Suite 309
Walnut Creek, CA 94596
925.949.1012

30 May 2023
File No. 0132051-005

PRIVILEGED AND CONFIDENTIAL
ATTORNEY WORK PRODUCT

Harrison, Temblador, Hungerford & Guernsey LLP
2801 T Street
Sacramento, California 95816

Attention: Mr. Adam Guernsey, Esq.
aguernsey@hthglaw.com

Subject: Geotechnical Evaluation
Vulcan Materials Company Cajon Creek Quarry Consolidation Project
2400 West Highland Avenue
San Bernardino County, California

Dear Mr. Guernsey:

Haley & Aldrich, Inc. (Haley & Aldrich) is pleased to submit this geotechnical evaluation report for Vulcan Materials Company's (Vulcan) proposed Cajon Creek Quarry Consolidation Project (Project). The report summarizes Haley & Aldrich's field data collection, provides our interpretation of the subsurface data based on current and previous investigations, and includes geotechnical recommendations for the proposed Project.

The Project Site, the Vulcan Materials Company Cajon Creek Quarry (Site) is located in the City of San Bernardino and in unincorporated San Bernardino County, east of Cajon Creek and north of the community of Muscoy. The Project Site is bounded by residential neighborhoods across Devil Creek Diversion Channel to the southeast, Historic Route 66/Cajon Boulevard to the northeast, an industrial development to the north, and Cajon Wash to the west.

The Project calls for deepening of existing quarry pits at Areas L and M and new aggregate material recovery and ancillary activities at Areas K, N, and Q. The proposed mining plan will effectively combine Area M and portions of Area N into a single pit, and Areas K, L, and Q into a second single pit. Each combined pit is separated by the existing Union Pacific Railroad tracks that wind through the Site in a generally north to south alignment. Vulcan is planning the following activities at the Site:

- Mineral resource extraction activities with a maximum depth of mining up to 240 feet below natural ground surface (bgs). The design incorporates a standard final reclaimed slope configuration of 2:1 (horizontal to vertical).
- Construction and operation of an elevated conveyor system arm connecting with Vulcan's existing conveyor system located on the Cajon Creek Site.
- Construction and maintenance of on-site roads.

- Operation of loaders, conveyors, and related equipment as necessary to move material from the Project Site to the conveyor system that will transport materials to Vulcan's existing conveyor system located on the Cajon Creek Site.
- Conduct all activities as described above and herein on approximately 494 acres of the Project Site.

Based on our evaluation of the subsurface conditions at the Site, we conclude that mining and future reclamation of the proposed quarry slopes up to a depth of 240 feet bgs at a standard slope configuration of 2:1 (horizontal to vertical) is geotechnically feasible. Slope stability analyses indicate that the proposed quarry slopes have static factors of safety ranging from 1.5 to 1.9, which are considered acceptable for the proposed project design features and are considered stable slope configurations. Pseudo-static analyses performed in conformance with the Bray and Macedo (2019) procedure indicate that the proposed quarry slopes are expected to yield following the design-level seismic event (i.e., reach a pseudo-static factor of safety of 1.0), resulting in estimated seismic-induced displacements of up to about 2 to 5 feet (84-percent confidence level). Modeling shows that seismic slope displacement will be confined to the quarry site and will not impact existing off-site properties or improvements.

This report includes findings and recommendations regarding geotechnical aspects of this project. Please reach out to Catherine Ellis at 925.949.4407 if you have any questions.

Sincerely yours,
HALEY & ALDRICH, INC.

Micah D. Hintz, PE, GE (CA)
Geotechnical Engineer, Project Manager

Catherine H. Ellis, PE, GE (CA)
Geotechnical Engineer, Senior Associate



Enclosures

\\haleyaldrich.com\share\CF\Projects\0132051\-005 Area Q Phase II Geotech\Deliverables\2022_Geotech_Eval\F2\2023_0530_HAI-CajonCreekPhaseIIGeotech-F2.docx

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HALEY ALDRICH

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Abbreviations

Abbreviation	Definition
amsl	above mean sea level
AP	Alquist-Priolo
ASCE	American Society of Civil Engineers
ASTM	ASTM International
bgs	below ground surface
CDMG	California Division of Mines and Geology
CEG	Certified Engineering Geologist
CGS	California Geological Survey
cm/s	centimeters per second
El.	Elevation
FER-240	Fault Evaluation Report
Haley & Aldrich	Haley & Aldrich, Inc.
HCl	hydrochloric acid
I.D.	inside-diameter
km	kilometer
ky	yield acceleration
MCE	Maximum Considered Earthquake
M_L	local magnitude
mm/year	millimeters per year
M_w	moment magnitude
NAVD 88	North American Vertical Datum of 1988
O.D.	outer diameter
PGA_M	peak ground acceleration
PHGA	peak horizontal ground acceleration
Project	proposed Cajon Creek Quarry Consolidation Project
PSHA	probabilistic seismic hazard analysis
SBVWCD	San Bernardino Valley Water Conservation District
SCEC	Southern California Earthquake Center
Site	Vulcan Materials Company Cajon Creek Quarry
SoC	Soboba Stony Loamy Sand
SPT	Standard Penetration Test
TerraMins	TerraMins Inc.
TvC	Tujunga Gravelly Loamy Sand
USCS	United Soil Classification System
USDA	United States Department of Agriculture
USGS	United States Geological Survey
Vulcan	Vulcan Materials Company

1. Introduction

This report presents the results of our geotechnical evaluation for the proposed Cajon Creek Quarry Consolidation Project (Project) of the Vulcan Materials Company (Vulcan) Cajon Creek Quarry (Site). The proposed Project is intended to continue open-pit mining operations at Cajon Creek Areas L and M (within the existing quarry limits) and at the Area Q Quarry (south of the Cajon Creek Quarry), performing mining to a maximum depth of up to 240 feet below ground surface (bgs), and to allow resource recovery at Area K and the northern portion of Area N.

The Project Site is located in unincorporated San Bernardino County, east of Cajon Creek and north of the community of Muscoy. The Project Site is bounded by residential neighborhoods across Devil Creek Diversion Channel to the southeast, Historic Route 66/Cajon Boulevard to the northeast, an industrial development to the north, and Cajon Wash to the west. Union Pacific Railroad tracks bisect the Site in a roughly north to south alignment. Nearby communities include Muscoy, the City of San Bernardino (adjacent to the east/north), and the City of Rialto (1.25 miles west), as shown on Figures 1 and 2. The approximate Site coordinates are 34.17°N and 117.36°W.

The Project will provide a high-quality source of local aggregate materials to serve the regional market. The Project will also allow for the continued operation of Vulcan's Cajon Creek Quarry and related nearby facilities.

1.1 BACKGROUND AND EXISTING SITE CONDITIONS

The Site has been divided by Vulcan into five quarry areas, designated Areas K, L, M, N, and Q. Area N is further subdivided, with the southern portion of this area designated as "open space." Descriptions of these areas are presented in this section.

Area K: Area K covers a footprint of approximately 35 acres, extending along the northeastern Site limits, parallel to Cajon Boulevard. This area has not been subjected to mining operations and is generally in a condition similar to its original, native state. A small access road is present in the southern portion of this area, connecting Cajon Boulevard to the southeast corner of Area L.

Area L: Area L spans an approximately 133-acre region in the northeastern portion of the Site. This area is adjacent to the northern limits of Area Q and the eastern right-of-way and setback limits of the Union Pacific Railroad line that crosses through the Site. Most of Area L has undergone mining operations and some portions of the area have been mined to depths of approximately 120 feet below original surface grade. Mine slopes are typically laid back at an inclination of 2H:1V (horizontal: vertical). Two areas are largely untouched by mining, including an approximately 18-acre, roughly square-shaped zone at the north end of this area, and an approximately 4.5-acre, triangular-shaped zone along the northeastern boundary. Outside of the mined area, surface topography slopes gently to the south and southeast at a 2 to 3 percent grade.

Area M: Area M spans an approximately 100-acre region in the northwestern portion of the Site. This area is bounded by the Union Pacific Railroad line to the east and Muscoy Groin #2 and Cajon Wash to

the west. Most of Area M has undergone mining operations and some portions of the area have been mined to depths of approximately 120 feet below original surface grade.

Area N: Area N is an approximately 53-acre, triangular-shaped region bounded by Area M on the north, Muscoy Groin #3, Union Pacific Railroad right-of-way and tracks, and Area Q to the east, and Cajon Wash to the south and west. This area is divided into two irregularly shaped sections, specifically, an approximately 16½-acre "Area N" in the northern portion and an approximately 36½-acre "Area N Open Space" to the south. No mineral resource recovery activities have taken place in this area; however, the northern portion of Area N has been disturbed as part of ongoing surface mining operations. We understand that the northern portion of Area N (excluding the open space) is planned to be combined with Area M into a unified quarry pit.

Area Q: Area Q spans a 196-acre region in the southern/southeastern portion of the Site. No mining activities have been performed in Area Q to date. Surface topography in this area slopes gently to the south and southeast at a 2 to 3 percent grade. The majority of Area Q is vacant land, though the area does contain several residential structures, small storage buildings, and storage yards. The land is currently zoned for residential use. Signs of active dumping of trash - including the presence of deleterious materials are - evident. Based on our review of historical aerial photographs, the Area Q site was generally vacant and unimproved in 1938, with the exception of Cajon Boulevard to the northeast. By 1959, several houses had been constructed within the limits of Area Q, and the currently existing dike was built along a portion of the Site's western boundary. The Devil Creek Diversion Channel appears to have been converted to a trapezoidal concrete-lined channel. By 1966, the Southern Pacific Railroad Tracks along the western boundary of Area Q were under construction, and construction of these tracks appears to have been completed by 1968. The 1966 and 1968 historical photos also show several new houses within the limits of Area Q. In 1995, excavation of Area M (northwest of Area Q) appears to have been initiated. Between 2005 and 2009, mining operations had also begun at Area L (north of Area Q).

1.2 PROJECT DESCRIPTION

The Project calls for continued aggregate resource recovery and ancillary activities within areas of existing mining operations at Areas L and M and within unmined Areas K, N, and Q. The proposed mining plan will combine Area M and a portion of Area N into a single western pit, and Areas K, L, and Q into a second single pit, with each combined pit separated by the existing Union Pacific Railroad tracks that intersect the Site in a generally north to south alignment. Specifically, Vulcan is planning the following activities at the Site:

- Mineral resource recovery activities to a maximum depth of up to 240 feet below natural (original) ground surface (bgs) at Areas K, L, M, and Q, and up to 120 feet bgs at Area N. The design incorporates a standard final reclaimed slope configuration of 2:1 (horizontal to vertical), which is in conformance with SMARA's prescriptive standards for slope stability (14 Cal. Code Regs., § 3704(d)).
- Construction and maintenance of on-site roads.
- Operation of loaders, conveyors, and related equipment as necessary to move material from the Project site to the conveyor system that will transport materials to Vulcan's existing conveyor system located on the Cajon Creek extraction Site.

If the project differs significantly from the description above, we should be provided the opportunity to review our recommendations for applicability.

2. Scope of Services

Haley & Aldrich, Inc.'s (Haley & Aldrich) approved services were presented in our proposal dated 11 September 2020 and revised 18 December 2020. Approved services included the following tasks: 1) performing site visits to collect data and observe existing Site conditions and surrounding features as they pertain to the proposed Project, 2) geologic logging of soil strata as exposed at the adjacent mining Areas L and M, and 3) subsurface exploration to further develop an understanding of Site stratigraphy and to collect physical samples for laboratory testing.

The results of our field exploration and laboratory testing were evaluated and engineering analyses were performed to develop conclusions and recommendations regarding:

- soil and groundwater conditions at the Site;
- site seismicity and seismic hazards including landslide potential;
- slope stability analysis using limit-equilibrium methods;
- site grading, including criteria for fill quality and compaction;
- seismic design parameters in accordance with the 2019 California Building Code; and
- mine operational considerations (as appropriate).

3. Field Investigation and Laboratory Testing

The investigation for this study included compilation of pre-existing geologic and geotechnical data from previous onsite explorations, performing field observations and evaluation of current site conditions, advancing six borings to depths of up to 270 feet bgs for mining classification and geotechnical engineering purposes, and performing limited laboratory testing. The methods and rationale for each of these investigation components are introduced in this section.

3.1 LITERATURE REVIEW

We performed a review of readily available documents pertaining to subsurface conditions at the quarry site and the immediately surrounding areas. These documents include the following:

- Boring logs prepared by Cleath & Associates describing subsurface conditions for six air-rotary borings (designated SB-04-01 through SB-04-06) drilled within Areas L and M in February 2004 (Cleath & Associates, 2004). The borings described in this report were advanced to depths ranging from 110 to 230 feet bgs, corresponding to elevations (El.) ranging from 1,346 to 1,422 feet (unknown vertical datum).
- TerraMins Inc. (TerraMins) data report titled, *Preliminary drilling results for 'Area Q', Muscoy, San Bernardino County, California* dated 11 November 2004. This data report includes boring logs for three borings drilled in Area Q, designated Q-04-01 through Q-04-03. The borings described in this report were advanced to depths of 200 feet bgs, corresponding to elevations ranging from 1,344 to 1,377 feet (unknown vertical datum).

These documents are presented in Appendix A. The locations of these historical borings are shown on Figure 2, Site Plan.

3.2 FIELD OBSERVATIONS

Observations of existing site conditions were performed by a California-licensed Professional Geologist during execution of the current field exploration program. A Certified Engineering Geologist performed a Site visit on 5 May 2018 to evaluate geologic conditions within Area Q and adjacent Areas L and M. Areas L and M showed slope walls consisting of similar alluvium material. However, most of the Area M slopes were smoothly graded and vegetated. Detailed findings from these field observation events are described later in this report.

3.3 TEST BORINGS

Six test borings, designated SB-21-01 through SB-21-06, were advanced to depths ranging from about 175 to 270 feet below the existing ground surface (approximately El. 1277 to El. 1354 feet) between 6 June and 2 July 2021. The test borings were performed to develop site stratigraphy, assess aggregate quality for mining purposes, measure current depths to groundwater, and produce geotechnical data for engineering analyses. The locations of the test borings are shown on Figure 2. Boring logs are included in Appendix B.

Sonic drilling methods were used to complete the test boring explorations in general accordance with ASTM International (ASTM) Standards (D6914). Sonic methods were advanced using a dual-tube system, in which the inner casing was advanced first (4-inch outer-diameter [O.D.]), followed by the outer casing (6-inch O.D.), which fit flush with each other. The inner casing was then retracted, and the soil was extruded.

Where geotechnical data were collected, the test borings were logged by a Haley & Aldrich field representative under the oversight of a California Geotechnical Engineer; test borings drilled for mining quality evaluation were typically logged by a California Professional Geologist provided by Vulcan.

Geotechnical sampling was performed at select depths at borings SB-21-04, SB-21-05, and SB-21-06 to develop geotechnical data for support of engineering analyses. Geotechnical sampling typically occurred at depths near and below the proposed bottom of the mine, between depths of 230 and 270 feet bgs at SB-21-03, from 85 to 175 feet bgs at SB-21-05, and from 90 to 180 feet bgs at SB-21-6. To accommodate the need to collect geotechnical samples, sonic drilling was paused after the inner casing was withdrawn, the borehole was cleaned out, standard (N) size geotechnical drill rods fitted with geotechnical sampling tooling (split-spoon sampler) were advanced, and soil samples were collected. After withdrawal of the geotechnical tooling, sonic core advancement was typically resumed for another 5 to 10 feet. This procedure continued to the bottom of each borehole.

Driven samples were collected using a split-spoon sampler. These steel samplers were driven up to 18 inches or to practical refusal using a 140-pound steel hammer falling 30 inches operated using a semi-automatic trip-hammer. The blow counts were recorded for successive 6-inch penetration intervals. Sampling was halted if practical refusal was encountered, which is defined as a blow count of 50 over 6 or fewer inches of sampler advancement. The number of blows required to drive the last 12 inches at each depth sampled was recorded as the Penetration Resistance (blows/foot) on the boring logs. A Standard Penetration Test (SPT) sampler (1.4-inch inside diameter [I.D.] and 2-inch O.D.) was used in general accordance with ASTM D1586.

Once the samplers had been withdrawn from the test borings, the samples were removed, examined for logging purposes, characterized in general accordance with ASTM D2487 (Unified Soil Classification System) and ASTM D2488 (Visual-Manual Procedures), labeled, and sealed to retain the natural moisture content for laboratory testing.

Each boring was backfilled with cement grout upon completion in conformance with permit requirements set by the County of San Bernardino. Drilling spoils not collected by Vulcan were stockpiled at the ground surface.

3.4 LABORATORY TESTING

A select group of soil samples retrieved using geotechnical sampling methods were hand-delivered to AP Engineering and Testing, Inc. of Pomona, California for geotechnical laboratory testing. Selected geotechnical samples were submitted for testing of moisture content (ASTM D2216), particle size analysis (sieve analysis; ASTM D422), and material finer than 75 micrometers (No. 200) sieve (fines

content; ASTM D1140). Moisture contents and gradation data are depicted on the boring logs in Appendix B. Compiled laboratory test result data sheets are presented in Appendix C.

We visited the Site on 12 April 2018 to collect physical samples of the native soils for laboratory testing. Two bulk samples were collected from the southern sidewall of Area L north of Area Q. These samples were shipped to Geo-Logic Associates of Grass Valley, California for shear strength testing. Due to the coarse nature of the material, a large-box direct shear test (ASTM D-3080 Modified) was performed on remolded 12-inch-square samples. Each remolded test sample was passed through a sieve prior to direct shear testing, to remove particles greater than 1.5 inches in size. Laboratory test results are presented in Appendix C.

4. Physical and Geologic Setting

4.1 TOPOGRAPHY

Topographic conditions vary significantly across the entirety of the Site due to mining operations. Surface topography conditions of each mine area are described below.

AREA K: Area K is largely defined by native terrain with the exception of a small access road present near the southern end of the area, connecting Cajon Boulevard to the southeastern corner of Area L. The elevations in this area range from a high of approximately 1,650 feet above mean sea level (amsl) to a low of 1,548 feet amsl. The topography gently slopes to the south-southeast at an average gradient of about 2½ percent.

AREA L: The majority of Area L has been subjected to open-pit mining, greatly altering the local topography from its original, native condition. The bottom of the mine pit is as low as approximately 120 feet below native surface grade in this area. Side slopes for the mine pit are typically laid back at an inclination of about 2H:1V, though some operational portions of this mine are inclined as steeply as approximately 1.3H:1V.

AREA M: The majority of Area M has been subjected to open-pit mining, greatly altering the local topography from its original, native condition. The bottom of the mine pit is as low as approximately 120 feet below native surface grade in this area. Side slopes for the mine pit are laid back at an average inclination of about 2H:1V, though some portions of this mine are inclined as steeply as approximately 1.6H:1V. Muscoy Groin #2, an elevated levee feature, is located along much of this area's western border.

AREA N: Area N is composed of areas of native terrain combined with a conveyor access road and a large, disturbed, unpaved lot storing mining equipment. The elevations in this area range from a high of approximately 1,596 feet amsl to a low of 1,565 feet amsl. The topography gently slopes to the south-southeast at an average gradient of less than 2 percent. Muscoy Groin #3, an elevated levee feature, is located along much of this area's southeastern border, west of the railroad tracks.

AREA Q: The topography of Area Q is relatively similar to native conditions, with some limited areas of minor grading performed to create the unpaved roads and building pads for the few structures present onsite. The ground surface elevations in this area range from a high of approximately 1,574 feet amsl to a low of 1,495 feet amsl. The topography gently slopes to the south-southeast at an average gradient of less than 2 percent.

4.2 REGIONAL GEOLOGY

The eastern San Gabriel Mountains are to the north of the Site. The uplift of the San Gabriel Mountains is the result of north-south compression. East-west extension is another minor tectonic factor of this area. In the area of the Site, the San Gabriel Mountains are bounded on the south by the Cucamonga Thrust Fault and the San Andreas Strike-Slip Fault to the northeast, with the San Jacinto Fault trending

between the two aforementioned faults up Lytle and Glen Helen washes and canyons. This area of the San Gabriel Mountains is highly fractured by the San Jacinto Fault, including the Glen Helen and Lytle Creek fault segments of the San Jacinto Fault system (Morton and Miller, 2006).

Rocks exposed in the eastern San Gabriel Mountains include metamorphic schist, gneiss, granulite, and areas of marble. Quartz monzonite and quartz diorite rock types intrude into large areas of the metamorphic complexes. Many areas of the igneous plutonic rock are foliated with cataclastic textures. Tertiary conglomerates, sandstones, and mudstones unconformably lie on top of, or at fault contact with, the metamorphic and igneous rock masses.

The alluvial process in the area is illustrated by mid to late Pleistocene fans, having well-developed incisions, while the latest Pleistocene to Holocene fan incisions are not as greatly developed. Fan geomorphology helps determine relative age of faulting in this area where the faults cut the different aged alluvial fans.

4.3 LOCAL GEOLOGY

Local geology consists primarily of alluvial deposits of various ages and thicknesses, which correspond to different flood events during large rainstorms. The San Gabriel Mountains to the north and San Bernardino Mountains to the east consist of mostly granitic and metamorphic rock types. The sands and gravels at the Site consist mostly of similar rock compositions, suggesting that the sands and gravels originated from the local mountains to the north and east. Based on our understanding of the alluvial deposits of the area, we determine that quarry materials are likely the result of basin deposition of the San Bernardino Valley with Holocene sands, along with gravel deposition from the Cajon Creek wash during the Holocene. Local geologic units are presented on Figure 3 – Geology Map.

4.4 REGIONAL AND LOCAL HOLOCENE FAULTS

Southern California is a very active seismic area consisting of many Holocene faults, and there are three major faults near the Site. Many of the Holocene faults in the region have been designated as being in Alquist-Priolo (AP) Special Studies Zones (Earthquake Fault Zones as known today), as these faults exhibit evidence of surface rupture in the last 11,000 years (Holocene Epoch) or are “sufficiently active and/or well-defined.” The three active faults and strands closest to the Site, namely the Glen Helen Fault Strand of the San Jacinto Fault, the Cucamonga Thrust Fault, and the San Andreas Fault are discussed in detail in the following sections. Below in Table I, known Holocene faults within 62 miles (mi) [100 kilometer (km)] of the Site are listed.

TABLE I
Active Faults within 62 mi (100 km) of the Cajon Creek Quarry
(United States Geological Survey [USGS], 2008)

Fault Name	Distance (mi)
San Jacinto*	<1
S. San Andreas	2.8
Cucamonga	4.7
Cleghorn	7.5

Fault Name	Distance (mi)
North Frontal (West)	11
San Jose	19
Sierra Madre	22
Sierra Madre Connected	22
Chino, alt 2	24
Chino, alt 1	24
Elsinore	27
Clamshell-Sawpit	28
Helendale-So Lockhart	30
North Frontal (East)	34
Puente Hills (Coyote Hills)	35
Raymond	36
Pinto Mountain	37
Puente Hills (Santa Fe Springs)	41
San Joaquin Hills	42
Lenwood-Lockhart-Old Woman Springs	43
Elysian Park (Upper)	43
Verdugo	45
Guernsey Valley (North)	46
Puente Hills (LA)	46
Newport Inglewood Connected (alt 1)	50
Newport Inglewood Connected (alt 2)	50
Hollywood	50
Landers	51
Newport-Inglewood (Offshore)	51
South Emerson-Copper Mountain	53
Santa Monica Connected (alt 2)	53
San Gabriel	53
Sierra Madre (San Fernando)	54
Burnt Mountain	55
Gravel Hills-Harper Lake	55
Eureka Peak	55
Calico-Hidalgo	59
Palos Verdes	59
Northridge	59
Santa Monica Connected (alt 1)	61
Blackwater	61

Notes:

**The Glen Helen fault is classified as a strand of the San Jacinto Fault Zone.*

4.4.1 San Jacinto Fault

The San Jacinto Fault is a right-lateral strike-slip fault that trends from below the Mexican border, extending about 135 miles to the north, and terminates where it meets the San Andreas Fault approximately 4 miles northwest of the Site in the San Gabriel Mountains. This fault has a slip rate of

approximately 7 to 17 millimeters per year (mm/year) with a return interval estimated in the 100- to 300-year range. This fault is capable of producing earthquakes with a moment magnitude (M_w) range of 6.5 to 7.5 according to the USGS 2008 National Seismic Hazard Maps database (USGS, 2008a), while the USGS 2014 Quaternary Fault and Fold Database of the United States includes sources along the San Jacinto fault capable of producing magnitude 8.0 (M_w) events (USGS, 2014). The Lytle Creek Fault Strand of the San Jacinto Fault system was found trending north through Lytle Creek into the San Gabriel Mountains approximately 3.5 miles west from the Site. The Glen Helen Fault, which is often classified as a strand of the San Jacinto Fault, has been mapped within the Site limits. A discussion of this fault strand and potential associated surface rupture hazards is provided in Section 4.4.4 – Evaluation of Glen Helen Fault.

4.4.2 Cucamonga Fault

The Cucamonga Fault is a thrust fault that trends along the southern front of the San Gabriel Mountains and terminates in the bedrock on the west side of Lytle Creek Wash. The thrust faulting component of the Cucamonga Fault and the uplift of the San Gabriel Mountains further illustrates the north-south tectonic compression in this area.

Historically, this fault has not been seismically active but past studies illustrate that the Cucamonga Fault is defined by large scarps that displace Holocene to latest Pleistocene alluvial sediments with all the scarps offsetting Holocene alluvial fan deposits. Eighteen recognizable seismic events were inferred within the last 12,600 years on three major strands of the Cucamonga Fault, as discussed in the California Division of Mines and Geology (CDMG) Fault Evaluation Report ([FER-240];1994). The scarps that cut older alluvium sediments had greater displacements and progressively were found to have lesser displacements in the younger alluvium sediments. In the last 13,000 years, the Cucamonga Fault showed a slip rate of about 5 mm/year but it could be greater (CDMG, 1994). The Cucamonga Fault near the Vulcan San Bernardino operation has produced earthquakes resulting in vertical displacements of approximately 6 feet, occurring every 625 years (Matti and others, 1992). This fault is not considered a fault rupture hazard that would impact the proposed project. This fault and other seismogenic faults in the area could create a local earthquake with the possibility of ground lurching on the Site's quarry perimeter where the surface seismic waves meet the quarry slopes (though not common in sandy and gravelly materials) generating parallel cracks forming rough blocks on the ground and minor slope failures such as dislodging of cobbles and boulders along the side slopes.

4.4.3 San Andreas Fault

The San Andreas Fault is a right-lateral strike-slip fault that is less than 3 miles from the Site and considered to be one of the most active faults in California. Seismicity associated with the 744-mile long San Andreas Fault system varies significantly, with observed recurrence intervals ranging from 20 to more than 300 years. Seismic events occurring along the San Andreas Fault near the Site tend to occur at longer recurrence intervals but may be less than other strand locations in the higher range of return intervals. According to Weldon and Seih, 1985, the San Andreas Fault has a slip rate of approximately 24.5 +/- 3.5 mm/year during the last 14,000 years in the nearby Cajon Pass. In past studies, in order to include the San Andreas Fault in the State of California AP zone, it was concluded that the fault consisted of a series of parallel and subparallel branches more than a mile wide.

The main trace is defined by linear scarps and fault displacement of Holocene alluvium. The branches are defined as high angle strike-slip faults and low angle thrust faults displacing rock and alluvium of various ages. Though the fault does not intersect with the Site limits, it could create local earthquakes with an M_w as high as 8.1 or slightly greater if most, if not all, of the fault's strands were to break during one event (USGS, 2008a). During the month of December 2015, a swarm of earthquakes and two earthquakes of M_w equal to 2.7 and 4.4 were monitored in the Devore area north of the Site near the intersection of the San Andreas and San Jacinto Faults. Earthquakes on the San Andreas Fault have had pre-historic seismic events that shook the study area numerous times with high ground accelerations during the Holocene and Pleistocene periods.

4.4.4 Evaluation of Glen Helen Fault

To illustrate the active nature of the San Jacinto Fault, the five historic earthquakes along the southern section of the fault, but not in the area of the Site, are as follows:

1. The 1889 Earthquake near the city of San Jacinto. Though the epicenter was not well located, the major damage in the cities of San Jacinto and Hemet suggests that the epicenter was close to these two towns.
2. The 1918 Earthquake near the city of San Jacinto. This earthquake had an estimated local magnitude (M_L) of approximately 6.5. The earthquake was late Sunday afternoon, when few people were at places of work, so casualties were low though damage to unreinforced brick buildings was high.
3. The 1937 Earthquake in the Terwilliger Valley some 20 miles south of the city of Indio. This earthquake had an estimated M_L of approximately 6.0. Since the Terwilliger Valley was in a sparsely populated area, little damage was noted except for a few chimneys, cracked plaster and broken windows near the area where the most intense shaking was experienced.
4. The 1954 Earthquake, sometimes known as the Arroyo Salada earthquake. The epicenter was about 30 miles south of the city of Indio. This M_L approximately 6.4 earthquake cracked plaster in San Diego and Los Angeles.
5. The 1968 Coyote Creek Fault Earthquake near the city of Borrego Springs and surrounding cities. This seismic event generated an M_w=6.5 earthquake. The Coyote Creek Fault Earthquake is mentioned since it is probably a strand of the San Jacinto Fault.

Geologic maps for the area indicate that the Glen Helen Fault strand of the San Jacinto Fault crosses through the western portion of the Site, as shown on Figure 2 – Site Plan. Most of the fault studies done to determine if the Glen Helen strand was active were performed north of the Site in the Glen Helen area. The portion of the fault that trends by the Site is mapped on published geology maps (e.g., California Geological Survey [CGS] FER-240) as a "concealed" fault trending though the southwest portion of Area Q. Geologic mapping by Morton and Miller (2006) provides an interpretation of the Glen Helen Fault crossing through the southwestern end of Area M, extending into the northeastern end of Area N, terminating before reaching the Union Pacific Railroad tracks and Area Q. Morton and Miller (2006) also mapped a second, unnamed fault strand traveling in an approximately north to south orientation along the far western edges of Areas M and N. Both mapped strands are considered

concealed; and extents and locations are not well-defined. The Site and surrounding area are located within an alluvial wash, so if pre-historic breaks of the Glen Helen Fault had broken the surface, forming a scarp displacing the ground, then rainstorm flooding, sedimentation, wind and/or anthropogenic processes may have covered or concealed the fault's trace.

A portion of the Glen Helen Fault is located within a State of California Earthquake Fault Zone. Additionally, the City and County of San Bernardino Department of Building and Safety considers the concealed fault trend of the Glen Helen Fault a Holocene Fault and suggests that this strand is the most active portion of the San Jacinto Fault system.

Given the seismic characteristics of the San Jacinto Fault and in particular its surface rupture history, relevant topographic, soils, and geologic maps, as well as aerial photos were analyzed as part of this geotechnical evaluation, as discussed in the following sections.

4.4.4.1 Topographic Maps

Two topographic quadrangle maps, the Arrowhead Quadrangle 7.5-Minute (USGS, 1941) and the San Bernardino North Quadrangle 7.5-Minute (USGS, 1996), were examined and compared to determine whether there was a topographic expression of the Glen Helen Fault. The quadrangles were used to demonstrate changes between 1941 and 1996. The topographic maps show two large washes that are linear in a northerly to southerly direction. Older topographic quadrangles did not express enough detail to delineate geomorphology of the fault trace.

In general, the Arrowhead and San Bernardino North 7.5-Minute quadrangle maps do not show lineations in the active washes of the Cajon or Lytle Creeks, but linear drainages are well defined in the bedrock to the north of the Site indicating a fault trace or other lineament type (USGS, 1996).

4.4.4.2 Soil Survey Map

The United States Department of Agriculture (USDA) Soil Survey Map (USDA, 2018) of the Site mapped two surficial soil units in the general area of the quarry, specifically, the Soboba Stony Loamy Sand (SoC) and the Tujunga Gravelly Loamy Sand (TvC). The Soboba Stony Loamy Sand consists of an A horizon's dry color of grayish brown, brown or pale brown coarse sand, sand to loamy sand to fine loamy sand with gravels, cobbles having a hue of Munsell 2.5Y or 10YR with a value of 4 or 6 dry and 4 or 5 moist with a chroma of 2 or 3. The moist, dark grayish brown (Munsell 2.5Y), stony loamy sand is generally loose, very friable, with abundant medium to fine roots and interstitial pores. The C horizon's dry color is generally a grayish brown or a bit lighter in color than the A horizon when dry.

The Tujunga Gravelly Loamy Sand (TvC) consists of an A horizon's dry color of brown to grayish brown fine sand, sand to sandy loam having a hue of Munsell 2.5Y or 10YR with a value of 4 or 7 dry and 3 or 5 moist, with a chroma of 1 to 4 dry and 2 to 4 moist. The moist color is Munsell 2.5Y. The C horizon's dry color is generally pale brown with a Munsell hue of 2.5Y or 10YR with a value of 5 to 8 and a chroma of 1 to 6 when dry and a value of 3 to 5 with a chroma of 2 to 4 when moist. These two soil types have a tonal difference that may explain some of the tonal changes found along concealed faults in the area mentioned in the FER-240. During the 5 May 2018 visit, the area near the Site where surficial tonal

changes and fault features such as lineations and scarps were mapped in FER-240 was visited. The area was disturbed by anthropogenic processes and changes in the wash morphology.

4.4.4.3 Geology Map

Four geologic maps: Regional Geology Map Series, San Bernardino Quadrangle (Miller et al, 2001), Geologic Map of the San Bernardino North 7.5-Minute quadrangle (Miller et. al., Open File Report [OFR] 2001-131), the Dibblee Devore and San Bernardino North 7.5-quadrangle maps (Dibblee, 2003 and 2004), and Geologic Map of the San Bernardino and Santa Ana 30 feet by 60 feet Quadrangles (Morton and Miller, 2006) were examined to analyze the geology and fault trends at and near the Site. The first map does show the San Jacinto and the San Andreas Faults trending near but not through the Site. The Miller geologic map shows the Glen Helen strand of the San Jacinto Fault to the west, while the Dibblee maps show the strand trending through the mid-section of the Site but terminating at the quadrangle boundary between the Devore and San Bernardino North quadrangles. The Miller geologic map locates the Glen Helen strand at nearly parallel to the 1974 AP Earthquake Fault Map, while the AP zone fault has a splay coming off the common Miller and AP strand and crossing the southwest end of the Site (see Figure 4). The Dibblee maps seem to have placed a concealed lineament that was placed on the FER-240 map that trends through the central portion of Area L located in the San Bernardino North quadrangle. During the field visit on 5 May 2018, the south walls of Area L were examined and no fault was seen displacing the alluvium on the slope.

4.4.4.4 Aerial Photo Analysis

During the compiling of the FER-240, black and white vertical aerial photo stereo pairs from the Department of Agriculture flown in late 1952 and early 1953, and USGS Water Resources Division black and white vertical photos flown in June 1967 were analyzed to identify any geomorphic changes in the landscape due to geologic and/or other natural processes. Tonal changes in the alluvium noted in these photos coincided with trenches by private consultants in which fault traces were found (FER-240). In the Muscoy area, other linear tonal features coincided with faults reported by the County of San Bernardino that could be explained as surface step-overs between the San Jacinto Fault to the south and the Glen Helen Fault to the north. There was no indication from aerial photos that subsidiary traces of the San Jacinto Fault are active, since they did not show offset or other geomorphic features that are indicative of Holocene movement.

Aerial photos were downloaded from the University of California Santa Barbara Frame Finder website and briefly compared to features analyzed during the compiling of FER-240. These photos did show some tonal contrasts, but some of the scarps could well be from changes in the channels in the washes during large rainstorms or from Holocene movement on the San Jacinto Fault. The map from the FER-240 map 2A shows evidence of the active faults identified during our ground reconnaissance and aerial photo analysis. Aerial photo interpretations are shown in purple. A “check-mark” indicates that the features found on the aerial photos could be verified, from other investigations, as traces of a Holocene fault and an “NV” indicates faults which could not be verified as Holocene faults.

5. Subsurface Conditions

Our understanding of subsurface conditions at the Site is based on the six subsurface explorations performed for this study, our review of historical subsurface explorations performed onsite by others, and our observations of exposed conditions along the mined slopes in Areas L and M. Subsurface conditions encountered by each of these explorations are discussed in this section.

5.1 PREVIOUS EXPLORATIONS

Historical boring logs were presented by TerraMins and Cleath & Associates documenting their subsurface exploration activities in Area L, M, and Q in 2004. The logs generally describe a subsurface profile at the Site consisting of granular alluvial deposits to the maximum explored depth of 230 feet bgs. The logs describe a subsurface profile composed of sands and gravels with cobbles as large as 6 inches. The brief discussion included with this letter notes that larger cobbles and even boulders could be present throughout the sediment layers, though these could not be identified in the 6-inch-diameter borings drilled using an AP1000 percussion drill.

The classifications presented on the Cleath & Associates and TerraMins logs provide useful data for understanding general subsurface conditions, with the important distinctions that 1) none of the historical logs include SPT blow counts for estimating relative density, and 2) the material descriptions presented on the TerraMins logs do not conform to Unified Soil Classification System (USCS) standards.

The TerraMins logs describe a subsurface profile consisting mostly of “clean sand and silt and gravel” and “gravel and sand,” with typical corresponding soil group symbols of SW and GW. The report states that material classifications were generally based on screening soils into three size categories, with materials smaller than the #10 sieve being classified as “sand/silt,” materials larger than the #10 sieve but smaller than the #4 sieve being classified as “gravel,” and materials retained on the #4 sieve being classified as “CRS (coarse) gravel.” These classifications are contrary to those presented by the USCS, which classifies all materials passing through the #4 sieve but retained on the #200 sieve as sands, for example. Based on this discrepancy, the TerraMins boring logs are considered to be useful for providing a general description of the site subsurface conditions (i.e., sands and gravels extending to the maximum explored depths), but descriptions such as “clean” and use of soil group symbols such as “SW” and “GW” are not considered compatible with USCS procedure and have been disregarded.

The Cleath & Associates logs present soil classifications in general conformance with USCS standards. Similar to the TerraMins logs, most soil units on the Cleath & Associates logs are described as clean sand and gravel (SW and GW) with trace cobbles and silt. The logs note that all grain size percentages on the logs are based on visual estimates.

Based on the results of grain size distribution testing performed on borings SB-21-01 through SB-21-06, and our discussions with Vulcan indicating that the typical fines content of extracted material from Areas L and M has been over 15 percent, we conclude that the material descriptions presented by TerraMins and Cleath & Associates likely underestimate the fines content of materials at the Site.

Additional details are presented on the boring logs in Appendix A.

5.2 CURRENT EXPLORATION

Subsurface conditions encountered during the current exploration program were logged by a representative from either Vulcan or from Haley & Aldrich. Materials logged by Vulcan were typically classified for mining suitability as opposed to engineering characteristics; therefore, material descriptions at the locations and depths logged by Vulcan generally contain fewer details describing engineering properties. Materials logged by Haley & Aldrich were classified in general conformance with USCS standards.

Materials encountered in borings SB-21-01 through SB-21-06 were found to consist predominantly of very dense silty sand with gravel (SM) to the maximum explored depth of 270 feet bgs and deepest explored elevation of 1,270 feet (North American Vertical Datum of 1988 [NAVD 88]). Grain size analyses performed on 33 split spoon (SPT) samples from borings SB-21-03, SB-21-05, and SB-21-06 reported an average fines content of 27 percent and an average gravel content of 9 percent. Actual in situ gravel percentages are expected to be higher than the laboratory-reported values, since the 1-3/8 inch inside diameter SPT sampler is incapable of collecting samples of larger coarse gravels and cobbles. Additional details are presented on the boring logs in Appendix B and laboratory test results in Appendix C.

5.3 AREAS L AND M SIDEWALL OBSERVATIONS

During our visit on 5 May 2018, a limited walkover was performed to evaluate the quarry materials, existing slope conditions within Areas L, M, and Q. The existing Areas L and M cut slopes exhibit large tabular beds and lenses of clean sand with some traces of silt and clay, cobbles and a few small boulders. The clasts were comprised mostly of metamorphic gneiss, schists and white marble with some granitic clasts. The sands were generally clean of fines, with a cemented matrix holding the sand grains in place but friable. A small talus pile consisting mostly of sand with some gravel and cobbles was forming at the toe of the slopes. The exposed slope showed evidence of having water flow across the face.

Active mine slopes at Area L held a high angle of repose with some slopes being vertical to nearly vertical. Washout erosional gullies in the central portion of Area L had high vertical cut slopes within the gullies with large fans of cobbles and large gravels on the gully bottom and spreading across the quarry bottom after exiting the gully. The fans were washed nearly clean of sand due to the velocity of water running across the mid slopes. After the sands were deposited onto the floor away from the cobble-gravel fans, the sand matrix hardened. When 10 percent hydrochloric acid (HCl) was applied to the sands, they effervesced, indicating that a fraction of carbonate was present in the sands giving a hardening effect to the slopes. The material in Area M appeared compositionally similar to Area L.

A small section of alluvial tabular and lens shaped deposits along the south slope above the sand conveyor in Area M and northwest of Area Q was exposed undisturbed. The remaining portion of the slopes were mechanically smoothed out and planted and did not show any significant slope failures or stability issues during the visit. In both Areas L and M, a levee system was constructed around the top of

the quarry slopes and along the edges of the access roads to prevent surface waters from pouring over the edge and eroding the existing slopes. Levees were also observed along elevated areas along the top of inter-quarry slopes.

5.4 GROUNDWATER

Groundwater elevations are highly variable across the quarry site. Our understanding of groundwater conditions is based on current and historical exploration data and local and onsite monitoring and supply well readings.

- Groundwater was encountered at two of the six borings drilled for the current investigation.
- Groundwater was encountered at El. 1,291 feet at boring SB-21-05 on 17 June 2021.
- Groundwater was also encountered at El. 1,354 feet at boring SB-21-06 on 1 July 2021.

Groundwater was not encountered at borings SB-21-01 through SB-21-04, despite being drilled to bottom elevations ranging from 1,289 to 1,354 feet. Groundwater was not encountered in any of the three Area Q borings advanced by TerraMins to a total depth of 200 feet between 4 and 6 November 2004, nor was groundwater encountered in any of the six borings at Areas L and M advanced by Cleath & Associates to depths ranging from 110 to 230 feet between 17 and 19 February 2004.

Monitoring and supply wells located within or near the Site provide recent groundwater level information. Vulcan operates a supply well for the quarry, located at the southwestern end of Area M as shown on Figure 2. Based on data provided by Vulcan, the static groundwater level at this well reportedly ranged from 190 to 222 feet below Area M's existing ground surface (310 feet to 342 feet below original grade) between January and June 2021. Observed differences in groundwater elevations have been attributed to concealed fault segments that cross the Area M pit, and consequently act as hydraulic barriers (URS, 1993). A groundwater well near the center of Area Q, designated MW-MIA 001A and monitored by San Bernardino Valley Water Conservation District (SBVWCD), reported groundwater level elevations of about 1,275 and 1,279 feet in December 2019 and December 2020, respectively (SBVWCD, 2021). Monitoring well MW-127A, located offsite and south of the intersection of Devil Creek Diversion Channel and Cajon Boulevard, reported groundwater elevations of about 1,256 and 1,255 feet in December 2019 and December 2020, respectively. Finally, a third well designated Muscoy Mutual 5, located approximately 200 feet south of the southern limits of the Site, reported groundwater elevations of about 1,087 and 1,082 feet in December 2019 and December 2020, respectively.

6. Seismicity and Seismic Hazards

6.1 SITE SEISMICITY

A probabilistic seismic hazard analysis (PSHA) was performed using the USGS Unified Hazard Tool website (https://earthquake.usgs.gov/hazards/interactive/). The deaggregation analysis utilized the USGS Dynamic Conterminous U.S. 2014 (v.4.2) edition. For this analysis, we used a shear wave velocity over the top 100 feet (30 meters) of the Site (V_{s30}) of 360 meters per second, corresponding to a shear wave velocity profile at the boundary between Site Classes C and D. Based on the seismicity of faults that may impact the quarry site and the results of the deaggregation analysis, a design earthquake with an M_w of 7.7 was selected for the seismic hazard evaluation. The peak horizontal ground acceleration (PHGA), which is based on the Maximum Considered Earthquake (MCE) with a return interval of 2,500 years, or a 2 percent probability of exceedance in 50 years, is 1.63g. The risk-based site-modified peak ground acceleration (PGA_M) is 1.195g; this value was computed based on procedures outlined in American Society of Civil Engineers (ASCE) 7-16.

Recommended code-based seismic values for the quarry Site in conformance with the 2019 California Building Code and ASCE 7-16 are presented in Table II.

TABLE II
Seismic Design Values

Seismic Parameter	Design Value
Site Class (ASCE 7-16 Table 1613.5.2)	C
MCE_R[1] Ground Motion (Period = 0.2 seconds), S_s	2.365 g
MCE_R Ground Motion (Period = 1.0 seconds), S_1	0.947 g
Peak Ground Acceleration, PGA	0.996 g
Site Amplification Factor at 0.2 seconds, F_a	1.2
Site Amplification Factor at 1.0 seconds, F_v	1.4
Site Amplification Factor for PGA, F_{PGA}	1.2
Site-Modified Peak Ground Acceleration, PGA_M	1.195 g
Site-Modified Spectral Acceleration Value at 0.2 seconds, S_{MS}	2.839 g
Site-Modified Spectral Acceleration Value at 1.0 seconds, S_{M1}	1.326 g
Design Spectral Acceleration at 0.2 seconds, S_{DS}	1.892 g
Design Spectral Acceleration at 1.0 seconds, S_{D1}	0.884 g

Notes:

1) *MCE_R = Risk-targeted maximum considered earthquake.*
2) *g = acceleration of gravity.*
3) *Design values presented above are based on a site located at latitude / longitude = 34.177428 / -117.363494.*

6.2 SEISMIC HAZARDS

During a major earthquake, very strong to severe shaking has the potential to occur at the Site. In general, shaking during an earthquake can result in ground failure, such as that associated with soil liquefaction, lateral spreading, cyclic densification, and seismic-induced landslides. Haley & Aldrich's assessment of these potential seismic hazards are presented in the following sections.

6.2.1 Liquefaction

Liquefaction is the process in which saturated, cohesionless soil experiences a temporary loss of strength due to the buildup of excess pore water pressure during cyclic loading resulting from earthquake ground motions. The type of soils most susceptible to liquefaction are loose, clean, saturated, uniformly graded sand and silt that have low clay content. Flow failure, lateral spreading, differential settlement, loss of bearing strength, ground fissures, and sand boils are evidence of liquefaction.

The Project Site has been evaluated by San Bernardino County for seismically induced hazards such as liquefaction and landslides, as reported on San Bernardino County Land Use Plan, General Plan, Geologic Hazard Overlays, Sheet FH22C (San Bernardino County, 2010). The County of San Bernardino has mapped the western portion of the Site (including the western end of Areas M and N) within a zone of "High" generalized liquefaction susceptibility, whereas the remainder of the quarry site has not been mapped by the County for seismic hazard susceptibility. The Project Site has not been evaluated by the California Geological Survey for seismically induced hazards such as liquefaction and landslides.

Based on current and historical subsurface explorations at the Site, available groundwater elevation data, and our understanding of Site history, we conclude that the potential for liquefaction to occur at the Site is low. Geotechnical drive samples performed at borings SB-21-04, SB-21-05, and SB-21-06 encountered driving refusal at all but one sample location, indicating a subsurface profile typically composed of very dense and non-liquefiable granular soils. The single SPT sample that did not achieve refusal blows (SB-21-06 at 170 feet) appeared to have encountered heaving soil conditions under over 25 feet of hydrostatic head resulting in unreliable blow counts. We conclude that the in situ condition of coarse-grained soil at this sample depth is likely very dense, for the following reasons: a) samples collected above and below this depth had similar compositions and met driving refusal during sampling, b) the depth of the sample (over 250 feet below original grade) indicates that the soil layer is under high overburden pressures that were even higher prior to mining operations at the Site, and c) the depth of the sample suggests likely Pleistocene deposition and exposure to multiple historical instances of very strong seismic shaking inducing densification.

Based on the currently proposed excavation depth of 250 feet bgs, we conclude the potential for liquefaction-related secondary effects, such as sand boils, lurch cracking, and lateral spreading to develop at the Site following the design seismic event is low.

6.2.2 Fault Rupture

Historically, ground surface displacements typically follow the trace of Holocene faults; however, in some cases an unknown fault may be located, resulting from a modern historical event. Based on the AP State of California Special Studies Zones Official Map for the San Bernardino North Quadrangle (CDMG, 1974), the Glen Helen Fault crosses the southwestern tip of the Site and is located within an Earthquake Fault Zone for a concealed Holocene fault. Geologic mapping performed by Morton and Miller (2006) indicates that a second concealed fault may cross through a portion of the Site, including the southern tip of Area M and portions of Areas N and Q, as shown on Figure 2, though this fault branch is not associated with a State of California Special Studies Zone.

Our field activities at the Site included field reconnaissance of the Areas L and M south slopes to discern physical signs of faulting. No major faulting was observed in the exposed beds and lenses other than a few small non-tectonic style cracks with insignificant signs of movement in the Area L slopes. The Area M south slope was bladed smooth and planted during a reclamation. Erosion of the slope exposed a few continuous layers of silt and clay with a few overlapping lenses. The Area M south slope was the closest to the inferred Glen Helen Fault trace which is mapped a few hundred feet to the west (CDMG, 1974). A small section of alluvial tabular beds and lens deposits along the south slope above the aggregate conveyor belt in Area M and northwest of Area Q was exposed, so that portion was examined for faulting and none was observed. The potential for surface fault rupture hazard was evaluated initially by conducting geological research consisting of a detailed literature search, analyzing historical topographic maps, soil survey maps for soil types and analyzing available historical aerial photos (Haley & Aldrich, 2019).

Neither the inferred Glen Helen Fault nor any other major faulting was seen when performing an observation of the Area L and M southern slopes. The upper sediments exposed in the southern slopes were inferred to be Late Holocene in age, while the inferred Glen Helen Fault was considered to be a Fault that moved or had a seismic event during the Holocene. The return interval of, or whether the inferred Glen Helen Fault could have a future seismic event, is not known at this time, but the inferred Fault will be considered active. If a seismic event developed on the inferred Glen Helen Fault, movement on the Fault would be expected to have dextral movement. If seismic offset did occur on the inferred Glen Helen Fault, the displacement transfer to the surface should be minimal because the very young fanglomerate sediments filling the basin and deposited in the area of Area Q are less brittle than bedrock. Our literature review did not identify a maximum amount of energy that could be released during a seismic event associated with the inferred Glen Helen Fault trace. It was estimated by Wesnousky, 1986, that the Glen Helen/Lytle Creek Faults have a slip rate of 10 mm/yr. The amount of dextral movement in the area of the quarry cannot be predicted at this time. As future information is collected, the amount of dextral movement on the inferred Glen Helen Fault during an earthquake event in the quarry could be assessed more accurately.

The sediments and stratigraphy consist of sand and gravels beds that are parallel and have no evident tectonic or depositional deformation. The Glen Helen Fault trace as inferred by Dibblee 2003 and 2004, or any sympathetic and or antithetic faulting from offset associated with the inferred Glen Helen Fault trace as published on the AP map sheets, was not evident in the southern slopes of Area L or Area M.

Although the inferred fault trace mapped by Dibblee may not be present at ground surface, it could be found at depth, so it is possible that new quarry slopes could expose the Fault during planned mining activities. Therefore, Haley & Aldrich recommends including the following mitigation as part of the Project: Approximately every 12 to 18 months during active mining, a California Certified Engineering Geologist (CEG) should observe exposed cut faces of the mining operations for evidence of the Fault, and if warranted assess the potential for surface rupture and/or slope failure.

6.2.3 Other Seismic Hazards

Known faults including the San Jacinto, San Andreas, and Cucamonga Faults are capable of inducing strong to very strong seismic events and geological seismic hazards, such as ground heave and lurching, ridge shattering, and landslides.

Ground lurching is the horizontal movement of soil, sediments, or fills located on relatively steep embankments or scarps as a result of seismic activity, forming irregular ground surface cracks. The potential for lateral spreading or lurching is highest in areas underlain by soft, saturated materials, especially where bordered by steep banks or adjacent hard ground. Based on the currently planned excavation depth of the proposed pit and the depth to groundwater conditions, the potential for zones of saturated material is low. The silty sands observed in our borings and at the existing pit bottoms often included a cemented matrix holding the sand grains in place, and sands at the bottom of the existing pits effervesced after the application of 10 percent HCl, indicating that a fraction of carbonate was present in the sands. The carbonate cementation provides a hardening effect to the slopes. These factors indicate that the lithofacies are not conducive to significant ground lurching, so no significant impacts are expected, based on the proposed Site use. As the potential for these hazards to manifest and associated risk of damage to the proposed site development are low, mitigation measures are not warranted.

Irrespective of the occurrence of seismic-induced slope displacement, strong seismic shaking may locally dislodge cobbles and boulders from slopes and could break the matrix bonds between sand grains causing local instabilities. Shallow debris falls could develop during a local seismic event. Due to the predominance of coarse-grained lithologies, the slopes are expected to exhibit high percolation rates, so a debris flow on the slopes after heavy rains followed by a large seismic event would be rare. In those cases where meteoric water could temporarily and locally perch along top of clayey silt layers, there would be insufficient head to compel extensive saturation and therefore the water should not accumulate, but rather laterally disperse within the sands. Given these physical characteristics and the lack of observed evidence of direct slope failure in the adjoining quarry areas, we conclude that the potential for surficial slope stability failures during a seismic event is low. Consequently, we consider the Project design slope configurations to be sufficiently stable under static conditions, and we do not consider the potential for failure to be significant.

Seismic-induced slope displacement is expected to occur as a result of design-level seismic shaking, and this is discussed in detail in Section 6.3 – Slope Stability Analysis.

6.3 SLOPE STABILITY ANALYSIS

Slope stability analyses were performed on cross-sections of the proposed 240-foot-high quarry slopes. The proposed slopes depicted on the cross sections are generally laid back at a maximum inclination of 2:1 (horizontal: vertical). However, some operational slopes such as in Area M (e.g., Section A, west slope) are inclined steeper than 2:1. In this situation, a bench was modeled at the existing quarry pit elevation to create an overall slope inclination of 2:1.

Final reclaimed slopes with an inclination of 2:1 are in conformance with SMARA's prescriptive standards for slope stability (14 Cal. Code Regs., § 3704(d)) and, therefore, presumptively stable. Notwithstanding, stability analyses were performed to calculate the proposed final reclaimed static and pseudostatic slope stability.

The stability analyses were performed using RocScience *Slide2*, a limit-equilibrium software program for analyzing static and pseudostatic (seismic) factors of safety for soil slopes.

6.3.1 Material Properties

Material properties for the slope stability analysis are based on current and historical boring logs and exploration data, observations of the adjacent Areas L and M sidewalls, and the results of limited laboratory testing on bulk samples collected from Area L. Based on these data sources, subsurface materials within the mining limits include granular alluvial deposits typically consisting of silty sand, silty gravel, cobbles, and boulders. For slope stability analysis, the design subsurface profile has been simplified to consist of layers of silty sand with gravel ("Sand") and silty gravel with sand ("Gravel"), primarily based on data collected during the current exploration program.

Soil shear strength properties for the Sand and Gravel layers were selected based on laboratory shear strength testing performed as part of our 2018 field exploration activities at the Site. Samples of the Sand and Gravel materials were retrieved from the southern sidewall of Area L. The samples were shipped to Geo-Logic Associates of Grass Valley, California, a specialty geotechnical lab with direct shear testing equipment capable of evaluating the shear strength of normally oversize gravel soils. A design friction angle and adhesion value for each material was selected based on the peak strengths. The unit weight of each soil type was estimated based on typical values for similar materials in this region. The soil properties used for analysis are presented in Table III. Laboratory test results are presented in Appendix C.

TABLE III
Material Properties Used for Slope Stability Analysis

Material Name	Unit Weight (pounds per cubic foot [pcf])	Friction Angle (degrees)	Adhesion (pounds per square foot [psf])
Sand	130	37	180
Gravel	130	41	0

6.3.2 Pseudostatic Slope Stability Analysis

Seismic (pseudostatic) stability of the proposed quarry slopes was analyzed using the Simplified Newmark method as described in California Geological Survey Special Publication 117 (SP-117). The Bray and Macedo (2019) procedure was used for estimating seismic-induced slope displacements based on probability of exceedance. This procedure is performed by determining the yield acceleration (ky) of a given slope configuration using limit-equilibrium analysis, selecting a design earthquake magnitude, estimating an initial fundamental period of the sliding mass as a function of critical failure surface height and average shear wave velocity of the subsurface profile, and selection of a design spectral acceleration that corresponds to a period equal to 1.3 times the initial fundamental period.

The slopes were evaluated considering the USGS earthquake scenario for an M_w 7.7 event occurring along the San Jacinto fault, rupturing through the San Bernardino, San Jacinto Valley, Anza, and Clark fault segments (USGS, 2012). The epicenter of this earthquake scenario is located approximately 9 miles northwest of the quarry. The Site is expected to experience a peak ground velocity of 80 centimeters per second (cm/s) under this scenario; this value was used for analyzing near-fault pulse ground motions. The horizontal component of motion with the maximum spectral ordinate was evaluated in our analyses.

Using these input parameters, each cross section was evaluated to estimate seismic-induced slope displacements at 50 percent and 16 percent (one standard deviation) probabilities of exceedance.

6.3.3 Slope Stability Results

The proposed sidewall slopes were analyzed by the limit equilibrium method, using circular searches with Spencer's Method to calculate the factor of safety against sliding. A static factor of safety of 1.5 or greater for slopes analyzed using this method is typically considered adequate for demonstrating stability. The minimum factor of safety for each cross-section under static and pseudo-static conditions is shown on Table IV. Graphical depictions of each analysis scenario and associated critical failure surface are provided in Appendix D.

TABLE IV
Results of Slope Stability Analyses

Section	Case	Factor of Safety	Seismic Yield Coefficient (ky)	Estimated Seismic Displacement (feet)	
				P.E. = 50%	P.E. = 16%
A-A' (West)	Static	1.5	--	--	--
A-A' (West)	Pseudostatic	1.0	0.233	2.2	3.9
A-A' (East)	Static	1.7	--	--	--
A-A' (East)	Pseudostatic	1.0	0.257	1.6	2.7
B-B'	Static	1.7	--	--	--
B-B'	Pseudostatic	1.0	0.260	1.5	2.6
C-C' (Overall)[2]	Static	1.8	--	--	--
C-C' (Overall)[2]	Pseudostatic	1.0	0.291	1.6	2.9
C-C' (Upslope)	Static	1.9	--	--	--
C-C' (Upslope)	Pseudostatic	1.0	0.312	1.4	2.5
D-D'	Static	1.7	--	--	--
D-D'	Pseudostatic	1.0	0.248	1.6	2.7
E-E' (Overall)[2]	Static	1.8	--	--	--
E-E' (Overall)[2]	Pseudostatic	1.0	0.280	1.8	3.2
E-E' (Upslope)	Static	1.9	--	--	--
E-E' (Upslope)	Pseudostatic	1.0	0.311	1.4	2.4

Notes:

1) *P.E. = Probability of Exceedance based on Bray & Macedo (2019).*
2) *Failure surface search encompasses entire slope, but critical failure surface is within lower portion of slope only.*

Slope stability analyses indicate that the proposed quarry slopes have static factors of safety ranging from 1.5 to 1.9, which are considered acceptable for the proposed project design features and are considered stable slope configurations for the project's proposed end use of open space. Pseudo-static analyses performed in combination with the Bray and Macedo procedure indicate that the proposed quarry slopes are expected to experience seismic-induced displacements of up to about 2.4 to 3.9 feet (84 percent confidence level) following the design-level seismic event.

In some locations, the pseudo-static critical failure surfaces extend beyond the property limits; however, our analyses show that these failure surfaces do not conflict with offsite improvements, including the Union Pacific Railroad tracks, Devil Creek Diversion Channel, Cal/Nev Pipeline, Muscoy Groins #2 and #3, and Cajon Boulevard.

7. Conclusions

Based on our evaluation of the subsurface conditions at the Site, we conclude that excavation of quarry pits to a total depth of 240 feet below original surface grades at Cajon Creek Quarry Areas K, L, M, and Q and to a total depth of 120 feet below original surface grade at the northern portion of Area N is geotechnically feasible, imposing low risk of geotechnical impacts to neighboring properties and improvements.

This conclusion is based on slopes with a design inclination of 2:1 (horizontal to vertical). Slope stability analyses indicate that the proposed quarry slopes have static factors of safety ranging from 1.5 to 1.9, which are considered acceptable for the proposed project design features and meet the standard of practice definition for stable slope configurations for the proposed end use. Pseudo-static analyses performed using the Bray & Macedo (2019) procedure indicate that the proposed quarry slopes are expected to experience seismic-induced displacements of up to about 2.4 to 3.9 feet (84 percent confidence level) following the design-level seismic event. Our analyses show that these slope movements are expected to be confined to the quarry site and are not expected to impact offsite properties or improvements.

The scope of this report is limited to a geotechnical evaluation of the proposed Cajon Creek Quarry Consolidation Project. We understand that the proposed Project plan evaluated for this study does not include construction of new temporary or permanent structures featuring human occupancy. If temporary or permanent structures for human occupancy are subsequently planned at the Site, we recommend that a supplemental study be performed to address geotechnical impacts and provide recommendations for foundation and seismic design, especially if these structures are planned within a State-designated Earthquake Fault Zone.

8. Limitations

This report has been prepared for specific application to the proposed quarry plans as understood at this time. If changes in the nature, design, or location of the Project are planned, the conclusions and recommendations contained in this report should not be considered valid, unless the changes are reviewed by Haley & Aldrich and the conclusions of this report are modified or verified in writing.

The geotechnical analyses and recommendations are based, in part, upon the data obtained from the referenced subsurface exploration. The nature and extent of variations between explorations may not become evident until construction. If variations appear at that time, it may be necessary to re-evaluate the recommendations of this report.

This report is prepared for the exclusive use of Vulcan Materials Company and their subconsultants in pursuit of the proposed quarry improvements in San Bernardino, California. There are no intended beneficiaries other than Vulcan Materials Company, and their subconsultants. Haley & Aldrich shall owe no duty whatsoever to any other person or entity on account of the Agreement or the report. Use of this report by any person or entity other than Vulcan Materials Company, and their subconsultants for any purpose whatsoever is expressly forbidden unless such other person or entity obtains written authorization from Vulcan Materials Company and Haley & Aldrich. Use of this report by such other person or entity without the written authorization of Vulcan Materials Company and Haley & Aldrich shall be at such other person's or entity's sole risk and shall be without legal exposure or liability to Haley & Aldrich.

References

Bray, Jonathan D. and Macedo, Jorge, 2019. Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes. ASCE Journal of Geotechnical and Geoenvironmental Engineering, 2019, 145(12).

California Building Standards Commission (CBC), 2019. 2019 California Building Code.

California Division of Mines and Geology, 1974, State of California Special Studies Zones, San Bernardino, North Quadrangle, Official Map. Effective 1 July 1974.

California Division of Mines and Geology, 1986. Regional Geology Map Series, San Bernardino Quadrangle—Map No. #A (Geology) Sheet 1 of 5, Compiled by E. J. Bortugno and T. E. Spitter, Revised, 1998.

California Division of Mines and Geology, 1994. Fault Evaluation Report FER-240, Holocene Faulting on the Cucamonga, San Jacinto and related Faults, San Bernardino County, California. 23 November 1994.

California Geological Survey, 2008. Special Publication 117A Guidelines for Evaluating and Mitigating Seismic Hazards in California.

California Geological Survey, 2018. Earthquake Fault Zones, A Guide for Government Agencies, Property Owners / Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California. Special Publication 42.

Cleath & Associates (CA), 2004. Vulcan Materials Company, Highland Avenue Plant San Bernardino, CA, Log of Boring SB-04-01, Boring SB-04-02, Boring SB-04-03, Boring SB-04-04, Boring SB-04-05, Boring SB-04-06.

Dibblee, T.W., and Minch, J.A., 2003. Geologic map of the Devore quadrangle, San Bernardino County, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-105, scale 1:24,000.

Dibblee, T.W., and Minch, J.A., 2004. Geologic map of the San Bernardino North/north 1/2 of San Bernardino South quadrangles, San Bernardino and Riverside County, California: Dibblee Geological Foundation, Dibblee Foundation Map DF-127, scale 1:24,000.

Lundgren, P., Hetland, E., Liu, Z. and Fielding, E., 2009. Southern San Andreas-San Jacinto fault system slip rates estimated from earthquake cycle models constrained by GPS and interferometric synthetic aperture radar observations, V. 114, Issue B2.

Matti, J.C., and others, 1982. Holocene faulting history as recorded by alluvial history within the Cucamonga fault zone: a preliminary view: Geological Society of America, Field trip 12, Cordilleran Section, 78th annual meeting, Anaheim, California, Guidebook, p. 21-44, Table 13.

Matti, J.C., Morton, D.M., and Cox, B.F., 1992. The San Andreas fault system in the vicinity of the central Transverse Ranges Province, southern California: U.S. Geological Survey Open-File Report 92-354, scale 1:24,000.

Miall, A.D., 1992. Alluvial deposits, In: Walker. R.G. James, N,P. (Eds,), Facies Models: Response to sea-level change, Geologic Association of Canada, p. 119-141.

Miller, F.K., Matti, J.C., Carson, S.E., and Cossette, P.M., 2001. Geologic map of the San Bernardino North 7.5' quadrangle, San Bernardino County, California: U.S. Geological Survey, Open-File Report OF-2001-131, scale 1:24,000.

Morton, Douglas M. and Miller, Fred K., 2006. Geologic Map of the San Bernardino and Santa Ana 30' x 60' Quadrangles, California. USGS Open File Report 2006-1217.

San Bernardino County, 2010. "San Bernardino County Land Use Plan, General Plan, Geologic Hazard Overlays," Sheet FH22C. http://www.sbcounty.gov/Uploads/lus/GeoHazMaps/FH22C_20100309.pdf

San Bernardino Valley Water Conservation District (SBVWCD), 2021. "Engineering Investigation of the Bunker Hill Basin 2019-2020," Appendix A, https://www.sbvwcd.org/reports-and-data/engineering-investigation/6436-2021-draft-engineering-investigation-appendices/file

SCEDC, undated. Significant Earthquakes and Faults, http://scedc.caltech.edu/significant/sanjacinto.html. Southern California Earthquake Data Center, California Institute of Technology.

Seed, H. B., 1979. Considerations in the earthquake-resistant design of earth and rockfill dams. 19th Rankine Lecture.

Stewart, J.P. and others, 2003. A Screen Analysis Procedure for Seismic Slope Stability: Earthquake Spectra, 19(3).

TerraMins, Inc., 2004. Preliminary drilling results for "Area Q", Muscoy, San Bernardino County, California.

USDA, National Resources Conservation Service, Soil Survey Maps. https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

URS, 1993. Remedial Investigation/Feasibility Study Report for Newmark RI/FS Groundwater Contamination Project.

United States Geological Survey (USGS), 1941. *Arrowhead, Calif. Edition of 1941.* Topographic map.

USGS, 1996. San Bernardino North Quadrangle, California-San Bernardino County, 7.5-Minute Series (Topographic). Topographic map.

USGS, 2008a. 2008 National Seismic Hazard Maps – Source Parameters. https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/query_main.cfm.

USGS, 2008b, Open File Report 2007-1437B, CGS Special Report 203B, SCEC Contribution #1138B, Version 1.0, Appendix B: Recurrence Interval and Event Age Data for Type A Faults, By Timothy E. Dawson, Ray J. Weldon II, and Glenn P. Biasi.

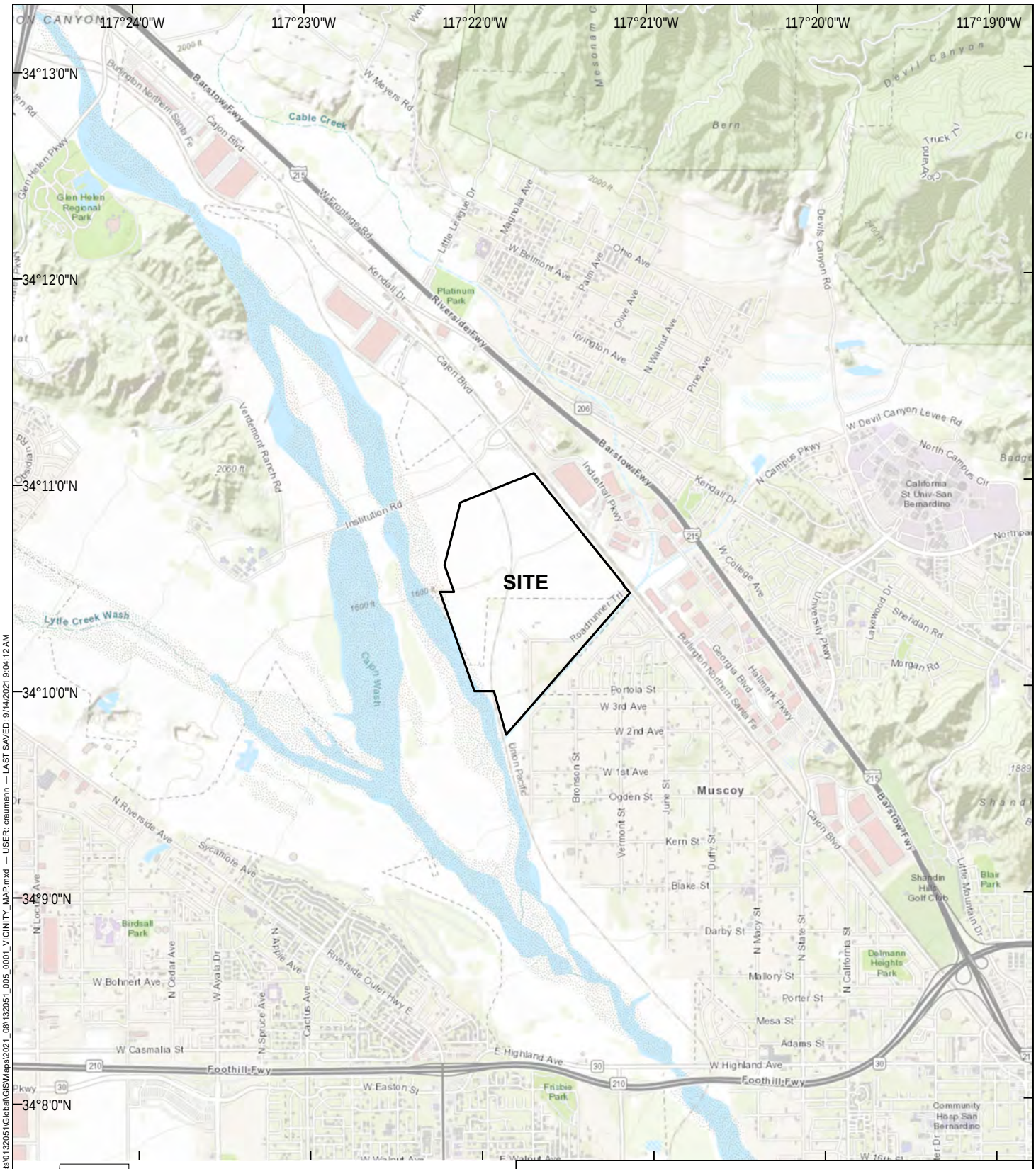
USGS, 2012. ShakeMap Scenario, Mw 7.7 San Jacinto; San Bernardino + SJ Valley + Anza + Clark. https://earthquake.usgs.gov/scenarios/eventpage/sclegacysanjacintosbvsjvacm7p7_se

USGS, 2014. Quaternary Fault and Fold Database of the United States. https://earthquake.usgs.gov/cfusion/qfault/

Weldon, Raj J. II and Sieh, Kerry E., 1985. Holocene rate of slip and tentative recurrence interval for large earthquakes on the San Andreas fault, Cajon Pass, southern California. GSA Bulletin (1985) 96 (6): 793-812.

Wesnousky, S.G., 1986. Earthquakes, quaternary faults, and seismic hazard in California. Journal of Geophysical Research 91.

FIGURES



HALEY ALDRICH

VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

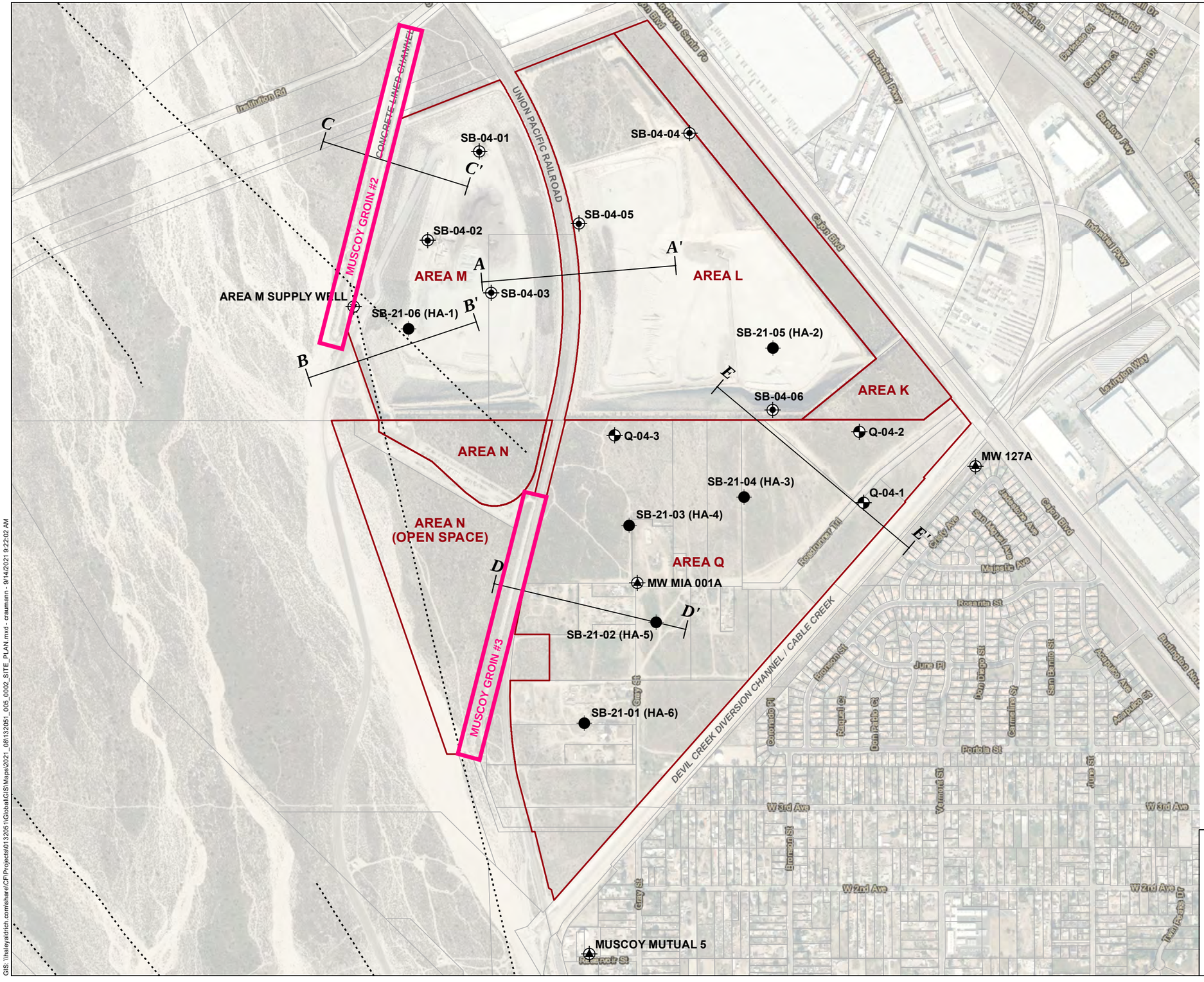
VICINITY MAP

MAP SOURCE: ESRI
SITE COORDINATES: 34°10'13"N, 117°21'36"

SCALE: 1 INCH = 400 FEET
MAY 2023

FIGURE 1

GIS FILE PATH: \\haleyaldrich.com\share\CF\Projects\0132051\Global\GIS\Maps\2021_08\132051_005_0001_VICINITY_MAP.mxd — USER: craumann — LAST SAVED: 9/14/2021 9:04:12 AM



LEGEND

- SONIC BORING (HALEY & ALDRICH, 2021)
- AIR PERCUSSION BORING (CLEATH & ASSOCIATES, 2004)
- AIR PERCUSSION BORING (TERRAMINS, INC., 2004)
- MONITORING WELL
- SUPPLY WELL
- CROSS SECTION
- MAPPED CONCEALED RIGHT-LATERAL STRIKE SLIP FAULT
- AREA BOUNDARY
- PARCEL

NOTES

1. FAULT DATA SOURCE: MORTON, DOUGLAS M. AND MILLER, FRED K., 2006, "GEOLOGIC MAP OF THE SAN BERNARDINO AND SANTA ANA 30' X 60' QUADRANGLES, CALIFORNIA, MAJOR FAULTS," VERSION 1.0

2. ASSESSOR PARCEL DATA SOURCE: SAN BERNARDINO COUNTY

3. AERIAL IMAGERY AND TRANSPORTATION DATA SOURCE: ESRI

N

0 850 1,700

SCALE IN FEET

HALEY ALDRICH

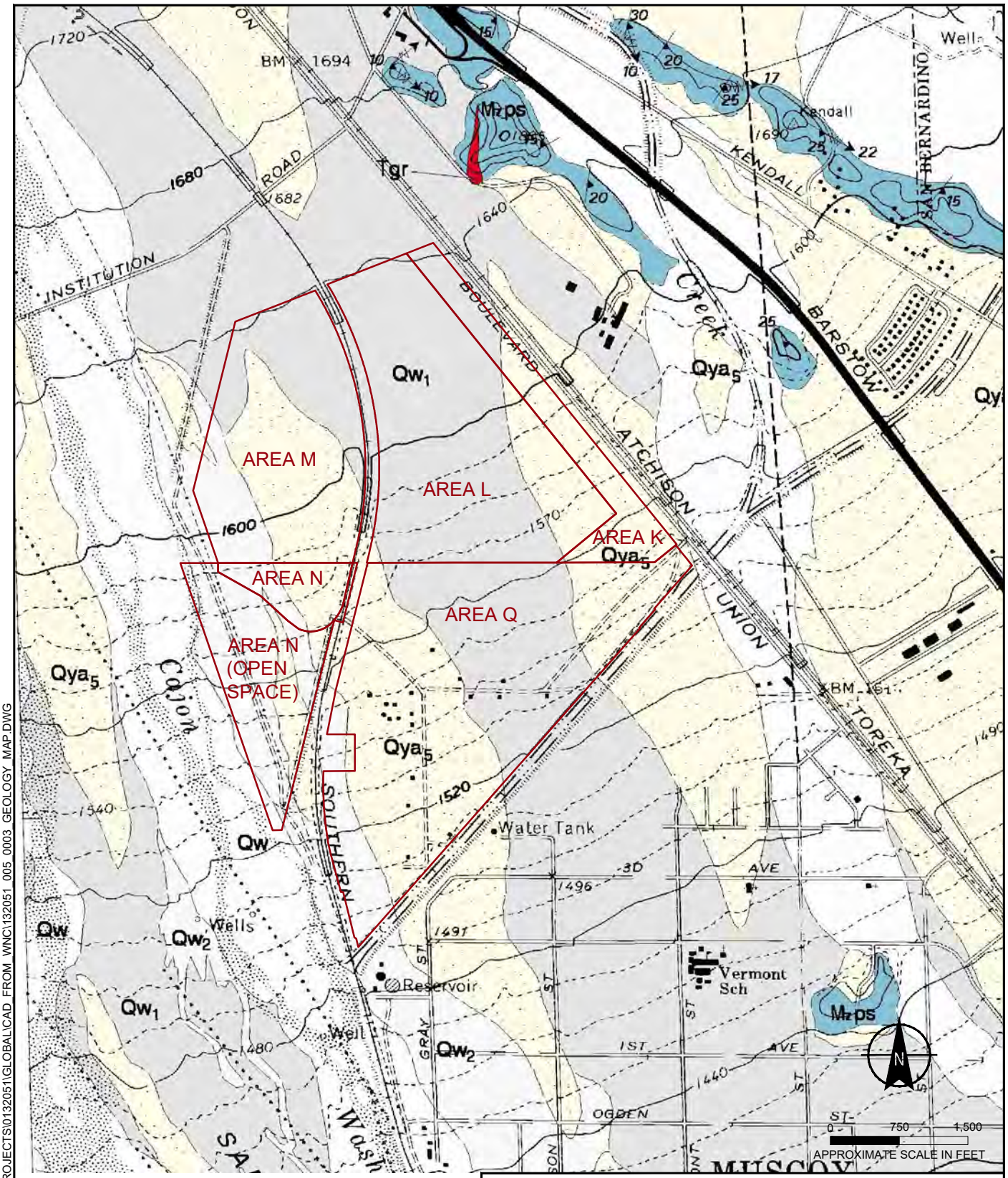
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SITE PLAN

MAY 2023

FIGURE 2

GIS: \\haleyaldrich.com\share\CF\Projects\0132051\Global\GIS\Maps\2021_08\132051_005_0002_SITE_PLAN.mxd - craumann - 9/14/2021 9:22:02 AM



LEGEND

AREA BOUNDARY

NOTES

SOURCE: MILLER, F.K., MATTI, J.C., CARSON, S.E., AND COSSETTE, P.M., 2001, GEOLOGIC MAP OF THE SAN BERNARDINO NORTH 7.5' QUADRANGLE, SAN BERNARDINO COUNTY, CALIFORNIA: U.S. GEOLOGICAL SURVEY, OPEN-FILE REPORT OF-2001-131

HALEY ALDRICH

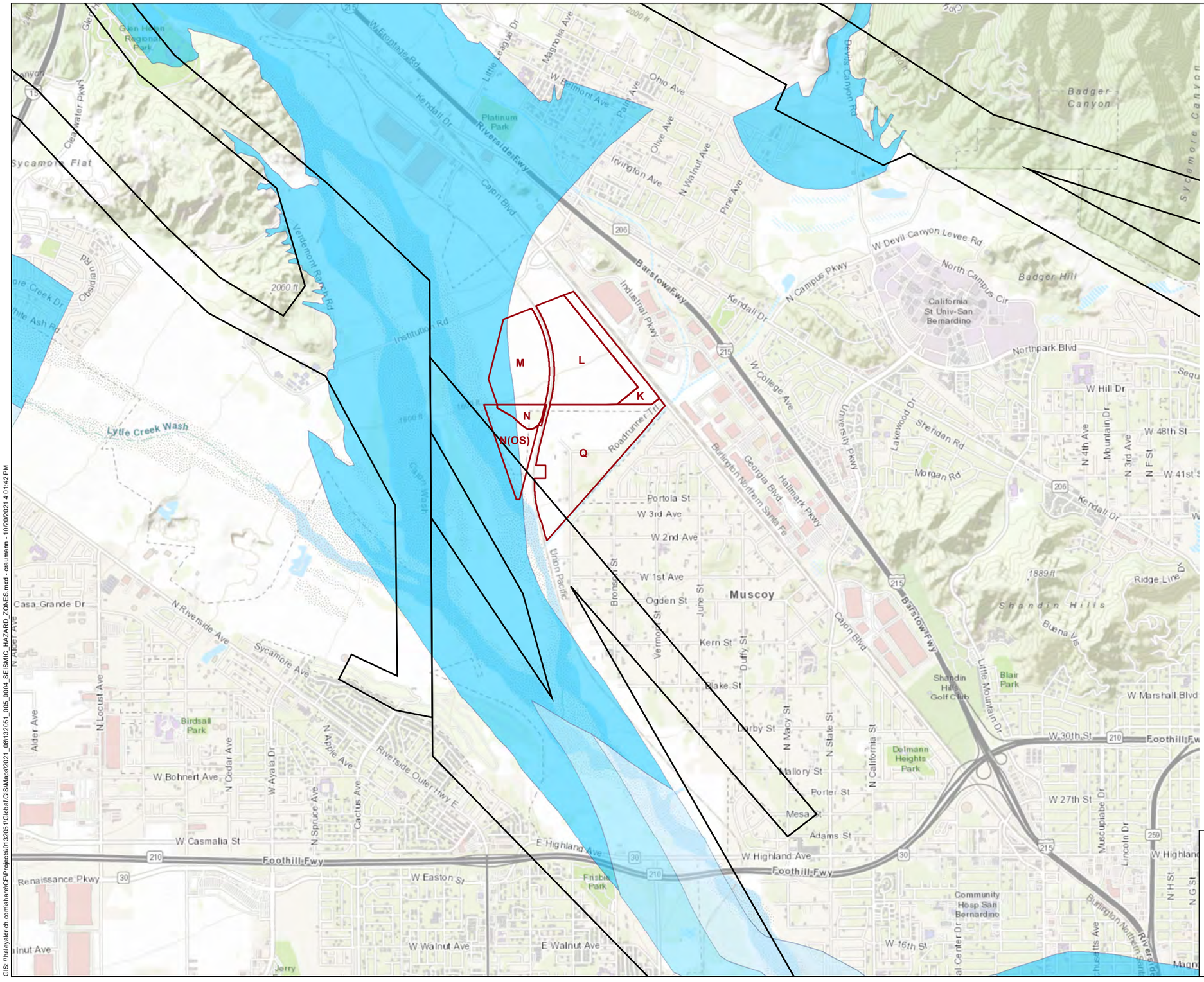
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

GEOLOGY MAP

SCALE: AS SHOWN
MAY 2023

FIGURE 3

Saved by: MOBINI, DARIUSH Printed: 9/14/2021 10:17 AM Sheet: FIG-2
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\GLOBAL\CAD FROM WNC\132051_005_0003_GEOLOGY_MAP.DWG



LEGEND

- AREA BOUNDARY
- ALQUIST-PRIOLO FAULT ZONE BOUNDARY

GENERALIZED LIQUEFACTION SUSCEPTIBILITY

- HIGH
- MEDIUM
- LOW

NOTES

1. FAULT ZONE DATA SOURCE: ALQUIST-PRIOLO EARTHQUAKE FAULT ZONE MAPS, CALIFORNIA GEOLOGICAL SURVEY WEB SERVICE

2. LIQUEFACTION DATA SOURCE: MAP DATA ORIGINALLY COMPILED ON 1:48,000 SCALE MOSAIKED MAPS PHOTO-REDUCED FROM 7-1/2 MINUTE USGS QUADS BY J.E. MATTI AND S.E. CARSON, 1986

3. BASE MAP SOURCE: ESRI WORLD TOPOGRAPHIC MAP

N

0 3,000 6,000

SCALE IN FEET

HALEY ALDRICH

VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SEISMIC HAZARD ZONES

MAY 2023

FIGURE 4

GIS: \\haleyaldrich.com\share\CF\Projects\0132051\Global\GIS\Maps\2021_0813205l_005_0004_SEISMIC_HAZARD_ZONES.mxd - craumann - 10/20/2021 4:01:42 PM

APPENDIX A
Historical Boring Logs and Reports

TerraMins Inc.
Consulting Mining/Economic Geologists

November 11, 2004

Ed Elkins
Vulcan Materials Company
2400 W. Highland Ave.
San Bernardino, CA 92407

Re: Drilling project at Area Q, Muscoy, CA: TerraMins Inc. Project # 200409

Dear Ed,

Attached is the report: *Preliminary drilling results for "Area Q", Muscoy, San Bernardino County, California*. The preliminary report was e-mailed to you on Sunday, November 7, 2004. This report includes a location map, areal photograph, drill logs, and photograph of samples.

The project began Monday November 1, with coordination with the bio monitor and the Vulcan Highland plant staff. Drilling commenced at 12:30 on Thursday November 4th with the arrival of the drill crew on site. Drilling progressed through Friday November 5th and was completed on Saturday November 6th at 9:30 AM. Final closure of the site, including burial of the drill sites, was done by Vulcan staff.

I thank you for the opportunity to work on this project. Please call or e-mail if you have any questions or comments.

Sincere regards,

Dinah O. Shumway
Principal Geologist
CA R.G. 5818

14360 St. Andrews Drive, Suite 4 • Victorville, CA 92392 • Phone: 760-285-5801 • Fax: 760-843-3488
E-mail: terramins@earthlink.net

Preliminary drilling results for "Area Q", Muscoy, San Bernardino County, California

TerraMins, Inc.
November 11, 2004

Introduction: This memo is a part of due diligence for a consideration of purchase, Vulcan Material Company (VMC) required subsurface information on the quality of the materials located on property, Identified as "Area Q" in Muscoy. The property is adjacent to the south of "Area M", already acquired by VMC (see photo attached).

TerraMins was engaged to oversee the drilling of three planned holes in the property under the direction of Ed Elkins. VMC hired the drilling contractor, Layne Christensen.

TerraMins geologist Dinah Shumway coordinated with the biological monitor, Highland Plant personnel, and the drilling contractor. Drill sites were selected and road grading proceeded with monitoring by Christine Tischer of eCorps environmental consultants. The location of the drill hole sites was partially restricted by the location of Stephens Kangaroo Rat habitat which was previously identified within Area Q (see attached PowerPoint photograph for location of drill sites).

Directions from VMC limited drilling to a 200' foot depth in all three holes. An AP100 percussion drill with a 6" diameter recovery system was used. Largest material recovered is limited to 6" cobbles

Drilling began on Thursday November 4, 2004 at 12:30 PM and was completed Saturday, November 6, 2004 at 9:30 AM. The holes were logged by Shumway. Samples were collected by Dale Dell of VMC labs.

Conclusions: The drilling results confirmed expectations for Area Q. The material in Area Q is fairly uniform with about 60% 70% of the material clean moderately graded sand, silt and gravel with a coarse gravel bed located about 120 to 150 feet. In the northwest part of Area Q, the sands below the 150 foot depth contain a higher percentage of coarse gravel (up to 50%).

Drilling Results:

The materials in Area Q are fluvial sediments within the Cajon Creek outwash system. Area Q grades gently from a 1510 foot elevation in the southern part to a high of 1586 in the northwest corner. The surface, vegetated with brush and various grasses consists of a fine soil with scattered boulders ranging from over 18" to cobbles of 2 to 3 inches. Several gravel bars are exposed on the surface notably in the northwest part of Area Q. Lithologies consist of gneiss, schist and granitic rocks and more rarely marble clasts.

TERRAMINS
14360 St. Andrews Drive, Suite 4 • Victorville, CA 92392 • Phone: 760-285-5801 • Fax: 760-843-3488
E-mail: terramins@earthlink.net

Upper 120': The logs of the three holes indicate that the stratigraphy in Area Q is uniform over the property. The material in the upper 100 feet of all three holes is a dark brown to dark grayish brown clean sand and silt with very minor clay. The sand and gravel is moderately graded. Sand is estimated to range from 60% to 70% overall in the upper 100 feet. Coarse gravel is rounded to sub-rounded with clast sizes up to 4" and averaging between 1" to 2". Very minor clay in the samples is limited to coatings on the coarse gravel. Preliminary screening of samples from the upper 100 feet of Q-04-1, and Q-04-2 indicate that the sand comprises about 50% to 60% by volume of the sample.

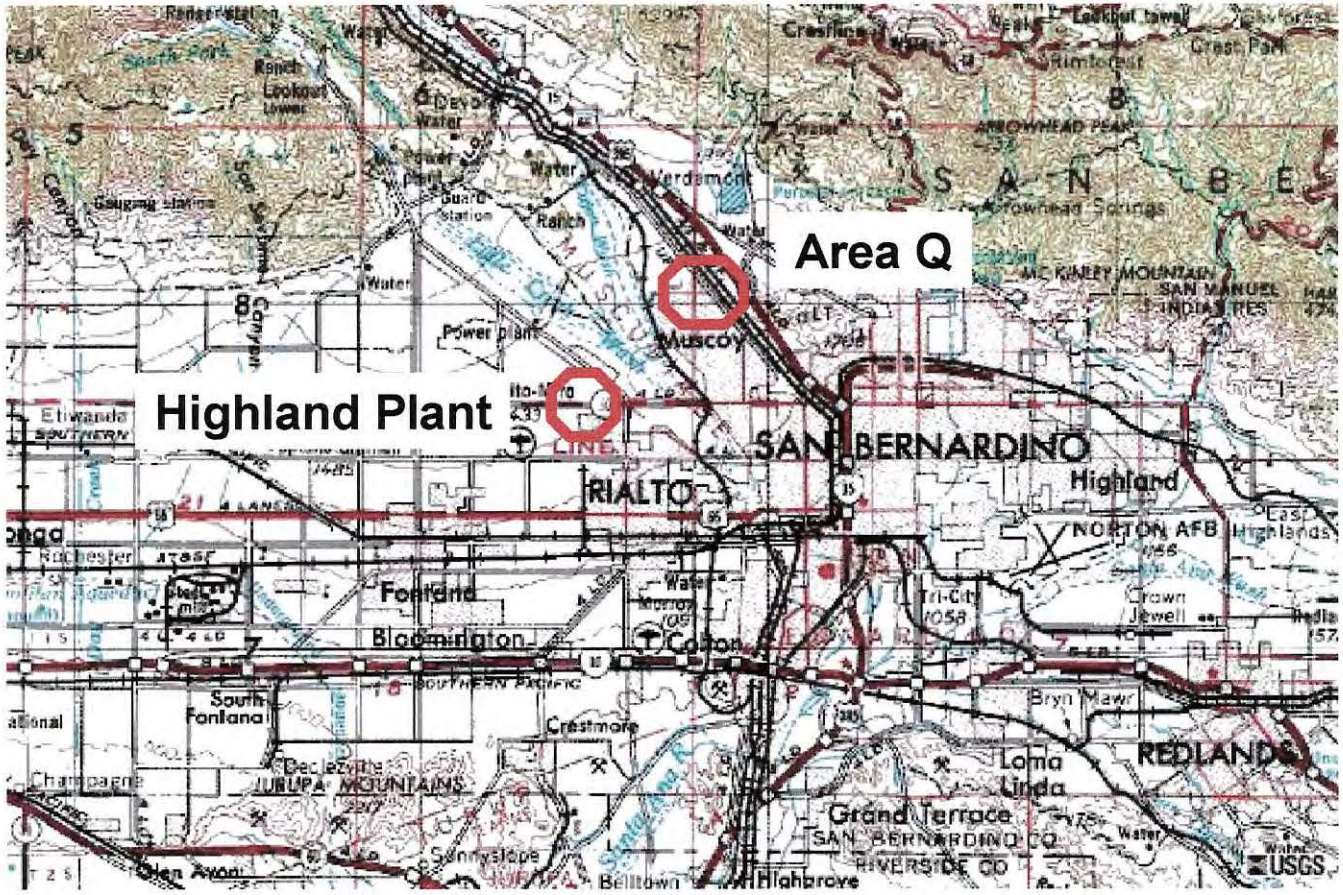
Four samples (about 3 pounds) from the upper 120 feet of drill holes Q-04-2 and Q-04-3 were collected for preliminary screening in TerraMins labs. Screening was limited to > #4 coarse gravel, >#10 fine gravel, < #10 sand and silt. Results of screening indicate that 50% to 60% by volume was < #10 sand and silt. Observation under microscope indicates that the sands are composed of 90% sub angular quartz grains. Only trace clay is present, mostly on coarse gravel clasts.

Lower 80': In all three holes the material from the 120' to 150 foot depths is gravel and sand and silt with coarse gravel comprising 50% to 60% of the material. Very minor clay is limited to coatings on clasts. Coarse gravel ranges in size from 1/2 inch to over 6". Gravels exhibit subrounded to angular textures. The samples below 120' included more broken rock chips. Some broken clasts exhibited moderate weathering. The sand lenses interbedded within these gravel beds was very clean and moderately graded.

The gravels between the 120' and 130' depths slowed drilling but the first hole (Q-01-1) was completed to the planned 200 foot depth in 3 hours. In holes 2 and 3 however, the gravel bed slowed drilling considerably and the higher presence of coarse gravel and cobbles in holes 2 (Q-01-2) and 3 (Q-01-3) required 6 hours each to complete drilling to the planned 200 foot depth. This likely indicates that the gravel bar thins or lenses out to the south.

Below 145' to 150' feet depths the logs indicate that the material is composed sand and gravels with 60% to 70% clean sand and silt and clay limited to coatings on the large clasts. The samples collected from the 2nd and 3rd holes (Q-04-2 and Q-01-3), contain a higher percentage of coarse gravel, cobbles and broken material (e.g. see photos of samples 180' to 190' attached).

Three samples (about 3 pounds) from the lower 80 feet of drill holes Q-04-2 and Q-04-3 were collected for preliminary screening in TerraMins labs. Screening was limited to > #4 coarse gravel, >#10 fine gravel, < #10 sand and silt. Results of screening indicate that 50% to 70% by volume was < #10 sand and silt. Observation under microscope indicates that the sands are composed of 90% sub angular quartz grains. Only trace clay is present, mostly on coarse gravel clasts.



Area Q, Muscoy, California

TerraMins Inc.
Consulting Mining/Economic Geologists
14360 St. Andrews Drive, Suite 4
Victorville, CA 92392

Drill Hole Log Q-04-1

Project:	Area Q	34° 10' 20.4"	Terramins Project No.: 200409
Location:	Muscoy, San Bernardino County	117° 21' 19.1"	1,885,722 N 6,756,670 E NAD 83
Client:	Vulcan Materials		

Location:	NW Corner 5th Avenue and Cajon Blvd.			Collar Elevation and Datum:	1544
Coordinates:	Lat:	Long:	Depth to Groundwater (ft) First:	Total Depth (ft):	200
Drilling Equipment/Method:	AP 1000 Percussion		Static:	Date Started: 11-04-04	12:30PM
Drilling Contractor:	Layne Christensen			Date Completed: 11-04-04	4:30 PM
Borehole Diameter:	6"	Logged by: D. Shumway		Checked by:	
LAB: Dale Dell					

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1544			easy drilling		moist	0' SW 10 YR 4 / 3	Lt Brn clean sand and silt (75%) and gravel (25%); sand crs to medium grained, some fine; coarse gravel (mostly 1/2", ranging 1" to 4"); minor clay on coarse gravel clasts; sub-rounded to sub-angular	
1534						10'	As Above	
1524						20' SW 10 YR 4/2	Grayish Brn clean Sand and silt (70%) and Gravel (20% to 30%); Crs Gravel; Minor clay on gravel clasts; Crs gravel sub-rounded to sub-angular ; minor clay on coarse gravel clasts.	
1214						30'	As Above	
1504						40' SW 10YR 5/2	Grayish Brn clean sand (60%) and Gravel (30%-40%); sand crs to medium, some silt; Gravel ranges 1.2" to 6"; some elongate clasts	

TerraMins Inc.

Consulting Mining/Economic Geologists
14360 St. Andrews Drive, Suite 4
Victorville, CA 92392

Drill Hole Log Q-04-1

Project:	Area Q		Terramins Project No.: 200409
Location:	Muscoy, San Bernardino County		
Client:	Vulcan Materials		

Location:	NW Corner 5th Avenue and Cajon Blvd.				Collar Elevation and Datum: 1544
Coordinates:	Lat:	Long:	Depth to Groundwater (ft)	First:	Total Depth (ft): 200
Drilling Equipment/Method:	AP 1000 Percussion			Static:	Date Started: 11-04-04 12:30PM
Drilling Contractor:	Layne Christensen				Date Completed: 11-04-04 4:30 PM
Borehole Diameter:	6"		Logged by: D. Shumway		Checked by:
LAB: Dale Dell					

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1494			easy drilling		moist	**50'** SW 10yr 4/2	Drk Brn clean sand and silt (60%) and Gravel (30%); clasts to 6"; sand crs to medium, some silt; clasts sub-rounded to sub angular; minor clay on clasts.	
1484						**60'** SW 10yr 4/2	As above: Gravel about 30% ; crs gravel to 2"	
1474						**70'** SW - GW 10yr 4/2	Drk brown clean sand (50%) and Gravle (40% to 50%); crs gravel to 4"; minor clay on clasts; moderately to poorly graded; gravel sub-rounded to sub angular	
1464						**80'** SW	Clean gravel (50% to 60% and sand and silt (50%); crs gravel clasts to 6"; sub-rounded ; minor clay on clasts; clasts sub-rounded; sand mostly crs.	
1454						**90'** SW	AS above: Note: no apprecdiable weathering 0-90'.	

TerraMins Inc.
Consulting Mining/Economic Geologists
14360 St. Andrews Drive, Suite 4
Victorville, CA 92392

Drill Hole Log Q-04-1

Project:	Area Q	Terramins Project No.:	200409
Location:	Muscoy, San Bernardino County		
Client:	Vulcan Materials		

Location:	NW Corner 5th Avenue and Cajon Blvd.			Collar Elevation and Datum:	1544
Coordinates:	Lat:	Long:	Depth to Groundwater (ft) First:	Total Depth (ft):	200
Drilling Equipment/Method:	AP 1000 Percussion		Static:	Date Started: 11-04-04	12:30PM
Drilling Contractor:	Layne Christensen			Date Completed: 11-04-04	4:30 PM
Borehole Diameter:	6"	Logged by: D. Shumway		Checked by:	
LAB: Dale Dell					

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1444			Slow drilling		moist	**100'** GW / SW 10YR 5/3	Drk Brn clean gravel (50% - 60%) and Sand; clasts to 6"; clasts sub-rounded to sub-angular; sand crs to medium, some silt; moderately to poorly graded; minor clay on clasts	
1434						**110'** GW / SW	Brn clean sand, silt (50%) and gravel (50%); crs gravel rounded to sub-rounded; clasts to 2"; sand mostly coarse, some silt. Moderately graded.	
1424					slightly moist	**120'** SW 10 YR 4 / 2	Drk grayish Brn gravel (+60%) and sand (40%); gravel sub-rounded to sub-angular; clasts to >6"; abundant broken clasts in sample; some flat and elongated clasts;	
1414						**130'** GW / SW 10 YR 4/2	Drk Brn Gravel (50%) and sand; clasts sub-rounded to sub-angular ; minor clay on clasts; silt 5%?; abundant borken clasts in sample.	
1404						**140'**	As above: Note: some large broken clasts show moderate weathering	

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Victorville, CA 92392

Drill Hole Log Q-04-1

Project:	Area Q	Terramins Project No.:	200409
Location:	Muscoy, San Bernardino County		
Client:	Vulcan Materials		

Location:	NW Corner 5th Avenue and Cajon Blvd.			Collar Elevation and Datum:	1544
Coordinates:	Lat:	Long:	Depth to Groundwater (ft) First:	Total Depth (ft):	200
Drilling Equipment/Method:	AP 1000 Percussion		Static:	Date Started: 11-04-04	12:30PM
Drilling Contractor:	Layne Christensen			Date Completed: 11-04-04	4:30 PM
Borehole Diameter:	6"	Logged by: D. Shumway		Checked by:	
LAB: Dale Dell					

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1394			easy drilling		slightly moist	**150'** SW	Drk Brn sand (60% to 70%) and gravel (20% -30%); clasts to 2" rounded to sub-rounded; sand medium to crs; some silt (5%)?; minor clay on clasts	
1384						**160'** SW-SP 10YR 5/3	Drk Brn clean sand (60% to 70%) and gravel (30%); sand crs to fine; some silt; clay on clasts; clasts to 6"; some elongae; sub-rounded to sub-angular	
1374						**170'**	As above: clasts to 2"	
1364						**180'** GW - SP 10YR 5/3	Drk Brn clean sand (60% to 70%) and gravel (30%); sand crs to fine; some silt; clay on clasts; clasts to 6"; some elongate; sub-rounded to sub-angular	

TerraMins Inc.

Consulting Mining/Economic Geologists
14360 St. Andrews Drive, Suite 4
Victorville, CA 92392

Drill Hole Log Q-04-1

Project:	Area Q		Terramins Project No.: 200409
Location:	Muscoy, San Bernardino County		
Client:	Vulcan Materials		

Location:	NW Corner 5th Avenue and Cajon Blvd.				Collar Elevation and Datum: 1544
Coordinates:	Lat:	Long:	Depth to Groundwater (ft)	First:	Total Depth (ft): 200
Drilling Equipment/Method:	AP 1000 Percussion			Static:	Date Started: 11-04-04 12:30PM
Drilling Contractor:	Layne Christensen				Date Completed: 11-04-04 4:30 PM
Borehole Diameter:	6"		Logged by: D. Shumway		Checked by:

LAB: Dale Dell

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon . Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1354			easy drilling		slightly moist	**190'**	
						SW 10YR 5/3 Drk Brnsand (70% - 80%) and gravel (20%); clasts to 4" rounded to sub-rounede; minor clay on clasts	
1344						**200'**	
						TD = 200'	

TerraMins Inc.

Consulting Mining/Economic Geologists
14360 St. Andrews Drive, Suite 4
Victorville, CA 92392

Drill Hole Log Q-04-2

Project:	Area Q	34° 10' 26.5"	Terramins Project No.: 200409
Location:	Muscoy, San Bernardino County	117° 21' 19.5"	1,886,339N
Client:	Vulcan Materials		6,756,633E

Location:	NW Corner 5th Avenue and Cajon Blvd.				Collar Elevation and Datum: 1557
Coordinates:	Lat:	Long:	Depth to Groundwater (ft)	First:	Total Depth (ft): 200
Drilling Equipment/Method:	AP 1000 Percussion			Static:	Date Started: 11-05-04 7:30 AM
Drilling Contractor:	Layne Christensen				Date Completed: 11-06-04 1:30 AM
Borehole Diameter:	6"		Logged by: D. Shumway		Checked by:

LAB: Dale Dell

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1557						0		
					moist	SW 10YR 4/3	Drk brn very clean sand (70% - 80%) and gravel (20%); clasts to 2", rounded to sub-angular; minor clay o	
1547						10'		
							As Above	
1537			easy drilling			20'		
						SW 10YR 4/3	very clean sand (70% - 80%) and gravel (20%) crs gravel clasts to 4"(1%), sub-rounded to sub-angular; minor clay on clasts	
1527					moist	30'		
						SW	As Above: crs gravel 5% - 10%	
1517						40' SW 10yr 5/3	Drk Brn clean sand (60%-70%) and gravel (30%-40%); moderate well sorted; clasts to 4"; sub-rounede to sub-angular; minor clay on clasts; some elongate clasts.	

TerraMins Inc.
Consulting Mining/Economic Geologists
14360 St. Andrews Drive, Suite 4
Victorville, CA 92392

Drill Hole Log Q-04-2

Project:	Area Q	Terramins Project No.:	200409
Location:	Muscoy, San Bernardino County		
Client:	Vulcan Materials		

Location:	NW Corner 5th Avenue and Cajon Blvd.			Collar Elevation and Datum:	1557
Coordinates:	Lat:	Long:	Depth to Groundwater (ft) First:	Total Depth (ft):	200
Drilling Equipment/Method:	AP 1000 Percussion		Static:	Date Started: 11-05-04	7:30AM
Drilling Contractor:	Layne Christensen			Date Completed: 11-06-04	1:30 PM
Borehole Diameter:	6"	Logged by: D. Shumway		Checked by:	

LAB: Dale Dell

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Material Description / Comments
						Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and homfels less comon . CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1507			easy drilling	screened; see photo	moist	**50'** SW 10YR 5/3 — Drk Brown clean sand and silt (60% - 70%) and gravel (30% - 40%); crs gravel to 6" (1%); pea gravel (10%); minor clay on clasts
1497						**60'** SW 10yr 5/3 — **As above**
1487						**70'** SW — Drk Brown sand and silt (60%) and gravel (50%); crs gravel to 4"; sub-rounded to sub-angular; minor clay on clasts
1477						**80'** SW — Drk Brown sand and silt (60%) and gravel (50%); crs gravel to 4"; crs gravel (10%?); sub-rounded to sub-angular; crs gravel to 8"; some elongate; crs gravel exhibits some minor weathering; minor clay on clasts.
1467				screened		**90'** GW/SW 10YR 5/2 — Drk gry Brn clean sand (60%) and gravel (40%); crs gravel (10%) sub-roundd to sub-angular; minor clay on clasts; clasts include marbel and homfels;

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Victorville, CA 92392

Drill Hole Log Q-04-2

Project:	Area Q	Terramins Project No.:	200409
Location:	Muscoy, San Bernardino County		
Client:	Vulcan Materials		

Location:	NW Corner 5th Avenue and Cajon Blvd.			Collar Elevation and Datum:	1557
Coordinates:	Lat:	Long:	Depth to Groundwater (ft) First:	Total Depth (ft):	200
Drilling Equipment/Method:	AP 1000 Percussion		Static:	Date Started: 11-05-04	7:30 PM
Drilling Contractor:	Layne Christensen			Date Completed: 11-05-04	1:30 PM
Borehole Diameter:	6"	Logged by: D. Shumway		Checked by:	
LAB: Dale Dell					

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1457			slow drilling		moist	**100'** SW	Clean sand, silt (70%) and gravel 30%); crs gravel (5%-10%); clasts to 3", sub-rounded to sub-angular	
1447						**110'** SW	Drk Brn sand (60%) and gravel (30%-40%); crs gravel to 2", some flat clasts; minor clay on clasts; crs gravel sub-rounded to sub-rounded; some broken clasts in sample.	
1437					slightly moist	**120'** GW 10YR 5/2	Grayish brn gravel (50%) and sand/silt (50%); moderately poor graded; clasts to 4"; sub-rounded to sub-angular; crs gravel slightly weathered; marble clasts common.	
1427						**130'** GW/SW 10YR 6/1	grayish brn gravel (50%) and sand/silt (40%); clasts to 6"; sub-rounded to sub-angular; minor clay on clasts; abundant marble clasts; broken clasts in sample.	
1417						**140'**	As above	

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Drill Hole Log Q-04-2

Project:	Area Q
Location:	Muscoy, San Bernardino County
Client:	Vulcan Materials
Terramins Project No.:	200409

Location:	NW Corner 5th Avenue and Cajon Blvd.				Collar Elevation and Datum: 1557
Coordinates:	Lat:	Long:	Depth to Groundwater (ft)	First:	Total Depth (ft): 200
Drilling Equipment/Method:	AP 1000 Percussion			Static:	Date Started: 11-05-04 7:30 AM
Drilling Contractor:	Layne Christensen				Date Completed: 11-05-04 1:30 PM
Borehole Diameter:	6"		Logged by: D. Shumway		Checked by:
LAB: Dale Dell					

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1407						**150'** GW/SW	drk brn Clean sand and silt (50%) and gravel (40%-50%); crs gravel to 6"; sub-rounded to sub-angular; minor clay on clasts; crs gravel slightly weathered	
1397						**160'** GW/SW	Drk Brn; sand and silt (50%) and gravel (40%-50%); crs gravel (10%); crs gravel clasts to 3"; sub-rounded to sub-angular; minor lay on clasts; broken crs gravel slightly weathered	
1387			slow drilling		slightly moist	**170'** GW	Brownish gray gravels (50%) and sand and silt (50%); clasts to 1"; sub-rounded to sub-angular; minor clay on clasts.	
1377						**180'**	Drk Brn Clean sand and silt (80%) and gravel (20%); crs gravel to 1"; sub-rounded to sub-angular; minor clay on clasts; some flat clasts.	

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Drill Hole Log Q-04-2

Project:	Area Q
Location:	Muscoy, San Bernardino County
Client:	Vulcan Materials

Terramins Project No.: 200409

Location:	NW Corner 5th Avenue and Cajon Blvd.			Collar Elevation and Datum:	1557
Coordinates:	Lat:	Long:	Depth to Groundwater (ft) First:	Total Depth (ft):	200
Drilling Equipment/Method:	AP 1000 Percussion		Static:	Date Started: 11-05-04	7:30 AM
Drilling Contractor:	Layne Christensen			Date Completed: 11-05-04	1:30 PM
Borehole Diameter:	6"	Logged by: D. Shumway		Checked by:	

LAB: Dale Dell

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1367			slow drilling		slightly moist	190'	Drk Brn Sand and silt (60%) and gravel (30%); clasts fub-rounded to sub-angular; minor clay on clasts	
1377						200'	TD = 200'	

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Drill Hole Log Q-04-3

Project:	Area Q	34° 10' 26.2"	Terramins Project No.: 200409
Location:	Muscoy, San Bernardino County	117° 21' 45.3"	1,886,295N
Client:	Vulcan Materials		6,754,405E

Location:	NW Corner 5th Avenue and Cajon Blvd.			Collar Elevation and Datum:	1573
Coordinates:	Lat:	Long:	Depth to Groundwater (ft) First:	Total Depth (ft):	200
Drilling Equipment/Method:	AP 1000 Percussion		Static:	Date Started:	11-05-04 2:30 PM
Drilling Contractor:	Layne Christensen			Date Completed:	11-06-04 9:30 AM
Borehole Diameter:	6"	Logged by: D. Shumway		Checked by:	
LAB: Dale Dell					

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1573			easy drilling		moist	0	SW 10YR 4/3	Drk Brn clean sand and silt (80%) and gravel (20%); crs gravel to 6" but average 4" (1%) rounded to sub-rounded; minor clay on clasts
1563						10'		As above
1553						20'	SW 10YR 4/3	Drk brown clean sand and silt (70%) and gravel (30%); crs gravel to 3" (10%); minor clay on clasts;
1543						30'	SW	As above
1533						40'		Drk Brown clean sand and silt (70%) and gravel (30%); crs gravel to 2" mostly 1"(10%); minor clay on clasts;

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Drill Hole Log Q-04-3

Project:	Area Q		Terramins Project No.: 200409
Location:	Muscoy, San Bernardino County		
Client:	Vulcan Materials		

Location:	NW Corner 5th Avenue and Cajon Blvd.				Collar Elevation and Datum: 1573
Coordinates:	Lat:	Long:	Depth to Groundwater (ft)	First:	Total Depth (ft): 200
Drilling Equipment/Method:	AP 1000 Percussion			Static:	Date Started: 11-05-04 2:30PM
Drilling Contractor:	Layne Christensen				Date Completed: 11-06-04 9:30 PM
Borehole Diameter:	6"		Logged by: D. Shumway		Checked by:
LAB: Dale Dell					

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1523			slow drilling	screened	moist	**50'** SW 10yr 4/2	drk grayish brn Clean sand silt (60%) gravel (30%); crs gravel sub-rounded to sub-angular (10%); clasts to 6"; moderately graded; minor clay on clasts;	
1513						**60'** SW 10YR 5/3	Drk grayish Brn sand silt (60%) gravel (30%); crs gravel sub-rounded to sub-angular (5%); clasts to 6"; moderately graded; minor clay on clasts;	
1503					slightly moist	**70'** SW	drk brn: sand and gravel; sand (80%) crs gravel 10%; some silt; crs gravel to 8" mostly 2"; rounded to sub-rounded; minor clay on clasts.	
1493						**80'** GW	Drk brn Sand (80%) and Gravel (10%); crs gravel sub-rounded to sub-angular; soe large clasts weathered; some flat and elongated; clasts to 6"; most 2".	
1483				scrn		**90' SW** 10YR 5/2	Grayish brn clean sand (80%) and gravel (20%); crs gravel mostly 2"; sub-rounded to sub-angular; sand medium to fine; minor clay on clasts	

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Drill Hole Log Q-04-3

Project:	Area Q
Location:	Muscoy, San Bernardino County
Client:	Vulcan Materials

Terramins Project No.: 200409

Location:	NW Corner 5th Avenue and Cajon Blvd.			Collar Elevation and Datum:	1573
Coordinates:	Lat:	Long:	Depth to Groundwater (ft) First:	Total Depth (ft):	200
Drilling Equipment/Method:	AP 1000 Percussion		Static:	Date Started: 11-05-04 2:30 PM	
Drilling Contractor:	Layne Christensen			Date Completed: 11-06-04 9:30 AM	
Borehole Diameter:	6"	Logged by: D. Shumway		Checked by:	

LAB: Dale Dell

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon . Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1473			fast drilling	screened	slightly moist	**100'** SW 10YR 5/3	Drk brn sand (80%) and gravel (20%); moderately poorly graded; crs gravel to 3"; rounded to sub-angular; some fine sand; fine gravel 20%?; minor clay on clasts;
1463						**110'**	as above: more broken clasts in sample
1453			slow drilling		dry	**120'** SW/GW 10YR 5/2	grayish drk brn gravel (40%) and sand (50%); crs gravel rounded to sub-angular; clasts to 3"; abundant broken clasts in sample; sand medium to fine; some fine sand; fine gravel 20%?; minor clay on clasts; clasts slightly weathred; some elongate
1443						**130'** GW 10YR 5/2	drk grayish brn sand (30%)and gravel (70%) crs clasts to 6", abundant broken clasts in sample; lg clasts slightly weathered; sub-rounded to sub-angular
1433						**140'**	grayish brn gravel (70%) and clean sand (30%) silt (10%)?; crs gravel clasts to 6", sub-angular; minor clay on clasts. (note; sand mostly quartz with minor feldspar)

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Drill Hole Log Q-04-3

Project:	Area Q	Terramins Project No.:	200409
Location:	Muscoy, San Bernardino County		
Client:	Vulcan Materials		

Location:	NW Corner 5th Avenue and Cajon Blvd.				Collar Elevation and Datum: 1573
Coordinates:	Lat:	Long:	Depth to Groundwater (ft)	First:	Total Depth (ft): 200
Drilling Equipment/Method:	AP 1000 Percussion			Static:	Date Started: 11-05-04 2:30 PM
Drilling Contractor:	Layne Christensen				Date Completed: 11-06-04 9:30 AM
Borehole Diameter:	6"		Logged by: D. Shumway		Checked by:

LAB: Dale Dell

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1423			slow drilling	screened	slightly moist	**150'** SW/GW 10YR 5/2	Drk brn sand (60%)and gravel (40%) ; crs gravel to 3"; sub-rounded to sub-angular; marble clasts; some clay on clasts.	
1413						**160'** SW 10YR 4/3	drk brn clean sand (70%)and gravel (20%) ; crs gravel to 6" but mostly 3"; sub-rounded ; some flat and elongated clasts; marble clasts; some clay mostly on clasts (1%)?; (note: very slow drilling- but doesn't seem to be the material)	
1403						**170'** SW	Drk Brn clean sand (70%) and gravel (30%); crs gravel clasts to 1" most 1/2"; sub-rounded; moderately graded; clay on clasts	
1393				screened		**180'** SW	Drk brn clean sand (70%) and gravel (30%); crs gravel to 1" (<10%); sand medium, some silt; crs gravel sub-rounded to sub-angular; crs gravel slightly weathered;	

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Drill Hole Log Q-04-3

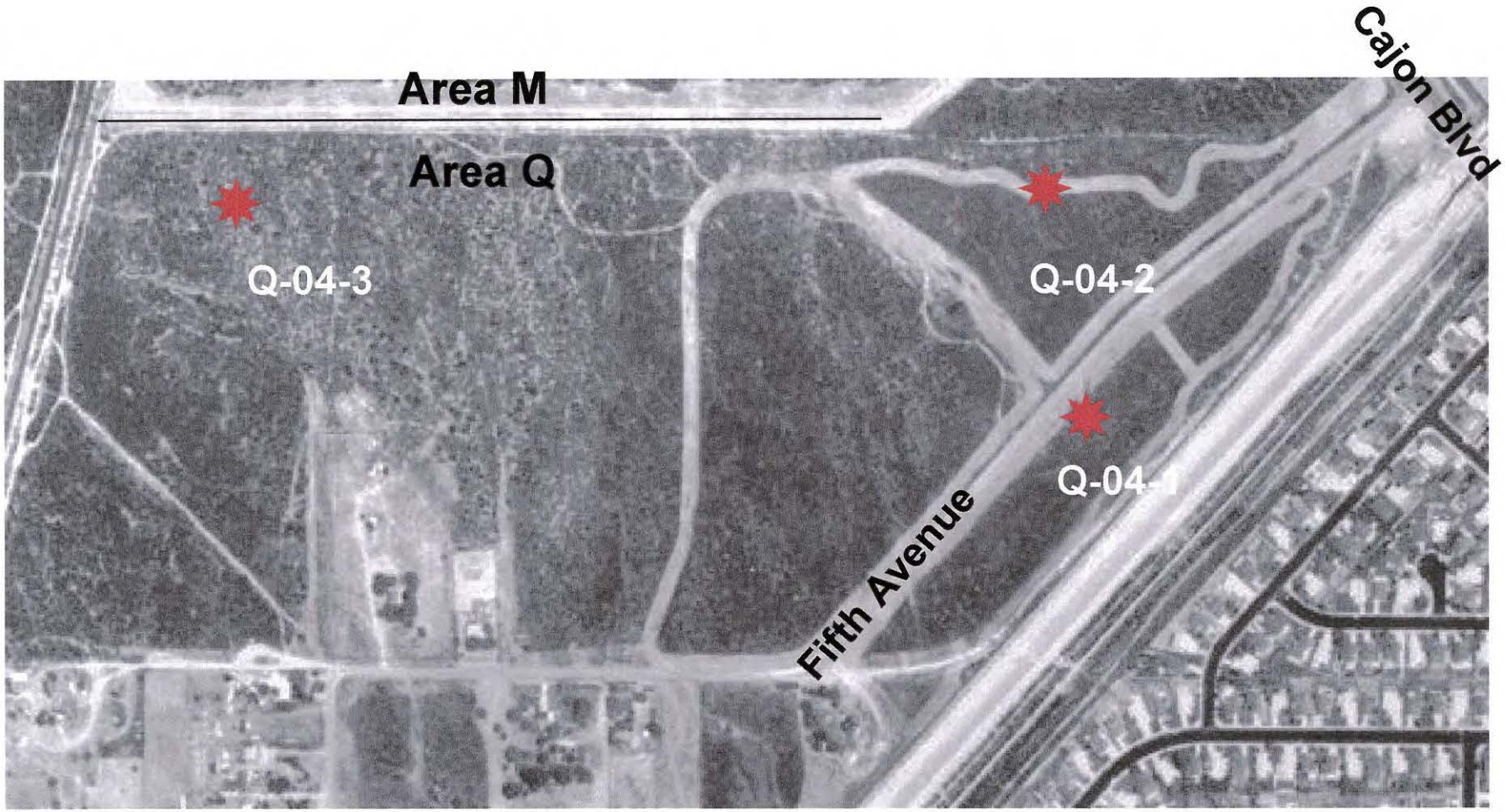
Project:	Area Q
Location:	Muscoy, San Bernardino County
Client:	Vulcan Materials

Terramins Project No.: 200409

Location:	NW Corner 5th Avenue and Cajon Blvd.			Collar Elevation and Datum:	1573
Coordinates:	Lat:	Long:	Depth to Groundwater (ft) First:	Total Depth (ft):	200
Drilling Equipment/Method:	AP 1000 Percussion		Static:	Date Started:	11-05-04 2:30 PM
Drilling Contractor:	Layne Christensen			Date Completed:	11-06-04 9:30 AM
Borehole Diameter:	6"		Logged by: D. Shumway	Checked by:	

LAB: Dale Dell

Elevation (feet MSL)	Depth (feet)	Sample No.	Recovery (%)	Bag Sample	Moisture Content (%)	Lithology, primarily gneiss and schist, with secondary granitic clasts. Marbel and hornfels less comon .	Material Description / Comments	CRS Gravel = > #4 Gravel = > #10 Sand / silt = < #10
1383				screened		**190'**		
						Drk brn sand (60%) and gravel (40%) coarse gravel 1" ; sub-rounded to sub-angular; minor clay on clasts;		
1373						**200'**		
						TD = 200'		



Area Q, Muscoy, California

Scale

.25 Mile

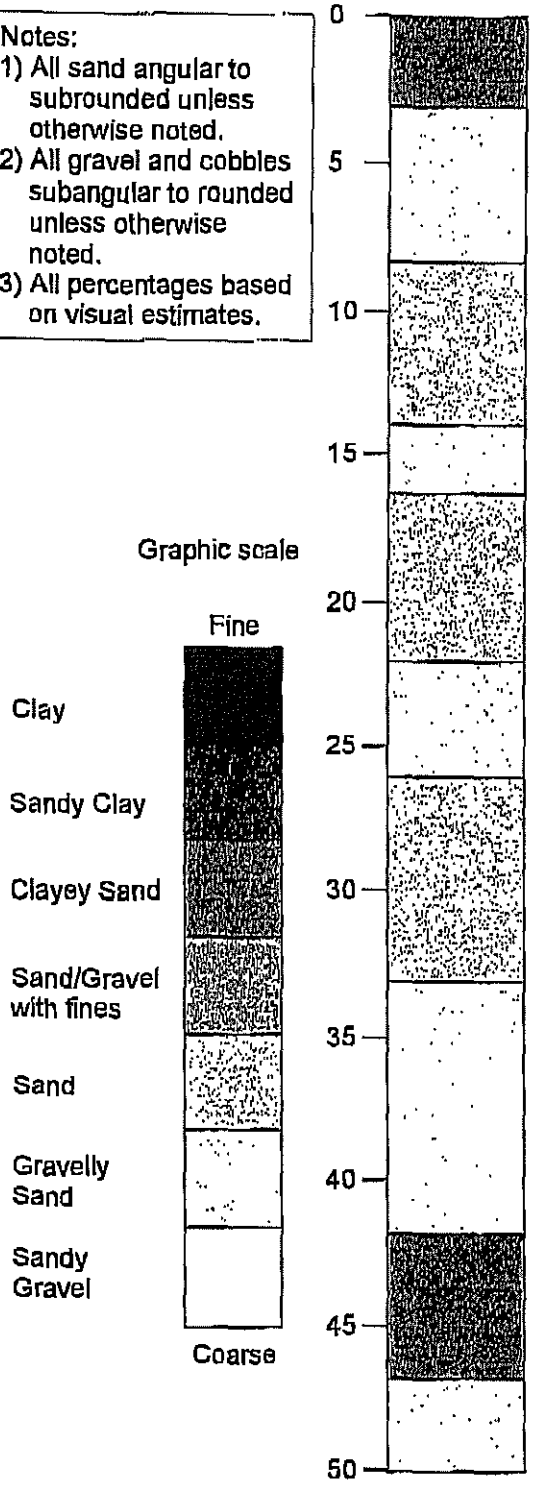
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,772 N
6,753,424 E

Ground elevation: 1,546'

Hole: SB-04-01
Date drilled: 2/17/04
Page: 1 of 3

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



0-3' **Silty Sand (SM);** light yellowish brown (10YR 6/4); 80% fine to medium sand, 15% silt, 5% gravel, humid.

3-8' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 15% gravel and cobbles, trace silt. Gravel subangular to rounded clasts, fresh to slightly weathered medium to coarse grained granitics, humid.

8-14' **Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, trace gravel, humid.

14-16' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 30% gravel with trace cobbles. Mostly slightly weathered granitics and gneiss with some moderately to highly weathered coarse grained, orthoclase-rich granitics, humid.

16-22' **Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 10% gravel, trace cobbles to 6", humid.

22-26' **Gravelly Sand (SW);** light olive brown (2.5YR 5/6); fine to coarse sand, 30% gravel with trace cobbles, gneiss boulder at 25 feet, trace silt, humid.

26-33' **Sand (SW);** light olive brown (2.5YR 5/6); fine to coarse sand, 15% gravel, trace silt, humid. Gravel clasts include schists and pegmatite that are only slightly weathered but are not resistant to hammer blows.

33-42' **Gravelly Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 30% gravel with trace cobbles, gneiss boulder at 40 feet, also schist, fine grained mafics, and coarse grained granitics, damp.

42-47' **Silty Sand (SM);** brown (10YR 5/3); mostly fine to medium sand, 10% gravel, 20% silt, damp.

47-55' **Gravelly Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 35% gravel with cobbles to 8", trace silt. Gravel angular to subrounded granitics and schist, fine to medium grained mafics and plagioclase pegmatite, damp.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-01
Site: Highland Avenue Plant, San Bernardino, CA

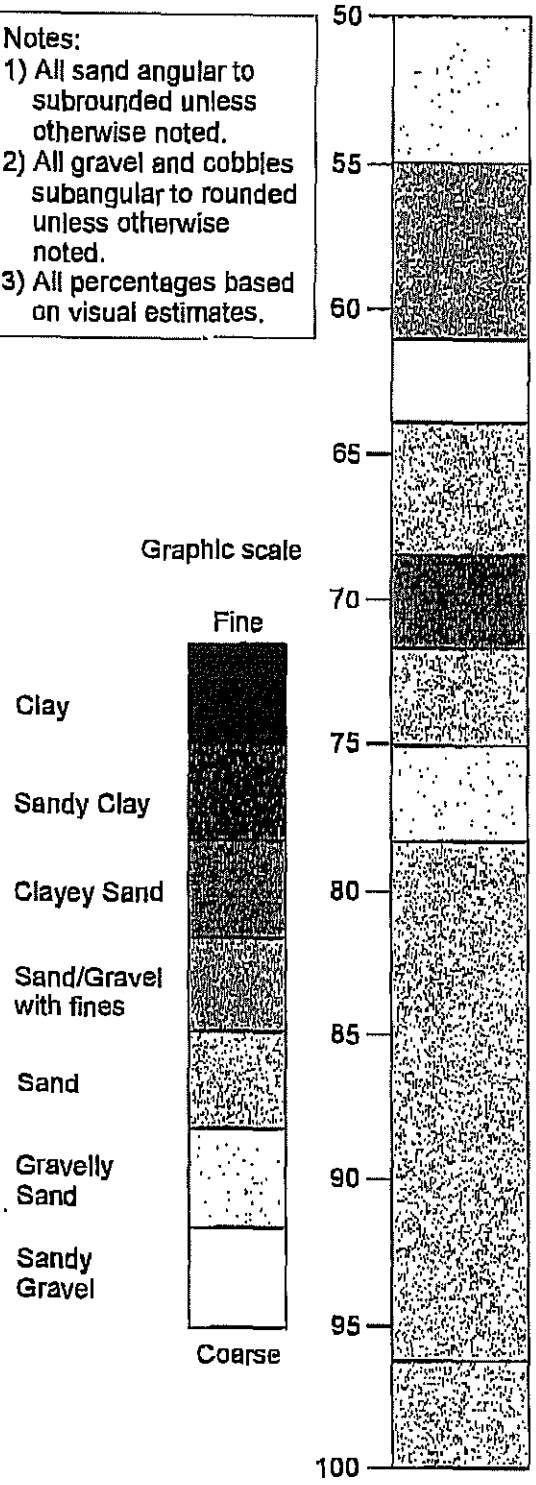
Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,772 N
6,753424 E
Ground elevation: 1,546'

Hole: SB-04-01
Date drilled: 2/17/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



47-55' **Gravelly Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 35% gravel with cobbles to 8", trace silt. Gravel angular to subrounded granitics and schist, fine to medium grained mafics and plagioclase pegmatite, damp.

55-61' **Sand with Silt (SW- SM);** yellowish brown (10YR 5/4); fine to coarse sand, 10% silt, 10% gravel, damp.

61-64' **Sandy Gravel (GW);** strong brown (7.5YR 5/6); 40% fine to coarse sand, 55% gravel and cobbles to 8", 5% silt. Quartz diorite, schist, fine to medium grained mafics, damp.

64-68' **Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 10% gravel, damp.

68-72' **Silty Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 35% gravel and cobbles, granite boulder at 71 feet, 20% silt, damp.

72-75' **Sand (SW);** dark yellowish brown (10YR 4/4); fine to coarse sand, trace silt, damp.

75-78' **Gravelly Sand with Silt (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 40% gravel and cobbles, quartz diorite boulder, 5% silt and 5% rock flour (from drilling method), damp. Gravel clasts moderately weathered mica schist, quartzite, fine grained mafics, and quartz diorite.

78-96' **Sand (SW);** dark yellowish brown (10YR 4/4); fine to coarse sand, micaceous, trace gravel, trace silt, damp.

96-104' **Sand with Gravel (SW);** dark yellowish brown (10YR 4/4); fine to coarse sand, 15% gravel, trace silt, damp.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-01
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

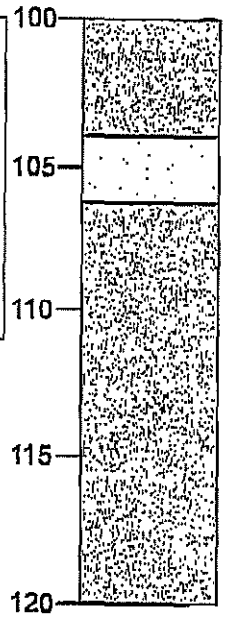
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,772 N
6,763,424 E

Ground elevation: 1,546'

Hole: SB-04-01
Date drilled: 2/17/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



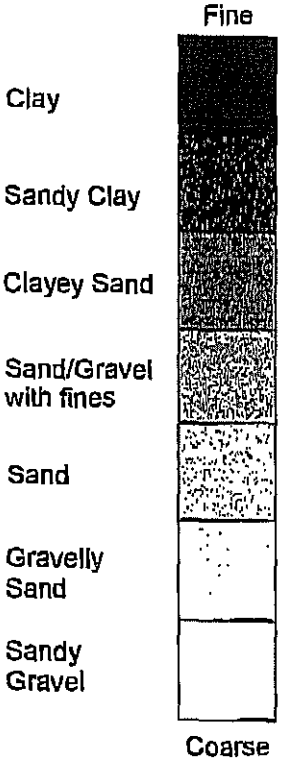
End of hole
No ground water

96-104' **Sand with Gravel (SW);** dark yellowish brown (10YR 4/4); fine to coarse sand, 15% gravel, trace silt, damp.

104-106' **Gravelly Sand (SW);** dark yellowish brown (10YR 4/4); fine to coarse sand, 30% gravel, trace silt, damp.

106-120' **Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, trace gravel, damp.

Graphic scale



Vulcan Materials Company

Rig: Foremost AP-1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-01
Site: Highland Avenue Plant, San Bernardino, CA

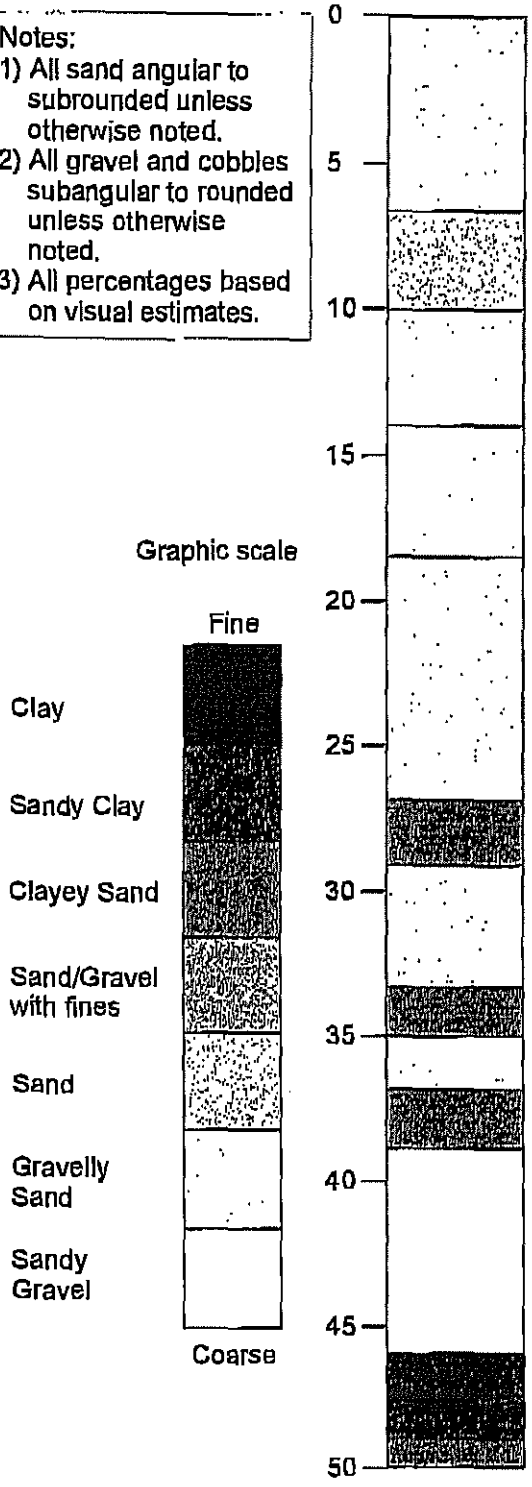
Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,066 N
6,752,926 E
Ground elevation: 1,511'

Hole: SB-04-02
Date drilled: 2/17/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



0-7' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 30% gravel to 3", trace silt. Abundant slightly weathered but relatively weak mica schist, with resistant quartzite and gneiss, humid.

7-10' **Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, trace gravel, trace silt, humid.

10-14' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 40% gravel with cobbles and boulders. Slightly weathered quartzite, gneiss, quartz diorite and fine grained mafics, humid.

14-18' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 20% gravel to 3", humid.

18-27' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 35% gravel with cobbles and boulders. Trace silt as rock flour. Moderately to highly weathered clasts of coarse grained granitics and weak schists. Quartzites and fine grained mafics remain slightly weathered and resistant to hammer blows, humid.

27-29' **Silty Sand with Gravel (SM);** yellowish brown (10YR 5/4); fine to coarse sand, 15% gravel, 20% silt, humid.

29-33' **Gravelly Sand (SW);** dark yellowish brown (10YR 4/4); fine to coarse sand, 35% gravel with cobbles to 8". Larger clasts (>1.5") slightly to moderately weathered, with finer gravels (<1.5") mostly moderately to highly weathered, humid.

33-35' **Silty Sand (SM);** dark yellowish brown (10YR 4/6); fine to medium sand, 15% silt, damp.

35-37' **Sand with Gravel (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 20% gravel with cobbles, trace silt. Gravel clasts subangular to subrounded, mostly moderately to highly weathered, some resistant quartzite, humid.

37-39' **Silty Sand (SM);** dark yellowish brown (10YR 4/6); mostly fine to medium sand, 15% silt, damp.

39-46' **Sand and Gravel (SW-GW);** pinkish gray (7.5YR 6/2); 50% fine to coarse sand, 50% gravel with cobbles and boulders, trace silt as rock flour. Finer gravel clasts (<1.5") are mostly moderately to highly weathered schists and coarse grained granitics. Large clasts slightly to moderately weathered fine to medium grained mafics and gneiss, humid.

46-49' **Sandy Silt (ML);** dark yellowish brown (10YR 4/6); fine to medium sand, 60% silt, damp.

49-52' **Silty Sand with Gravel (SM);** dark yellowish brown (10YR 4/6); mostly fine to medium, micaceous sand, 20% silt, 15% gravel, damp.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-02
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

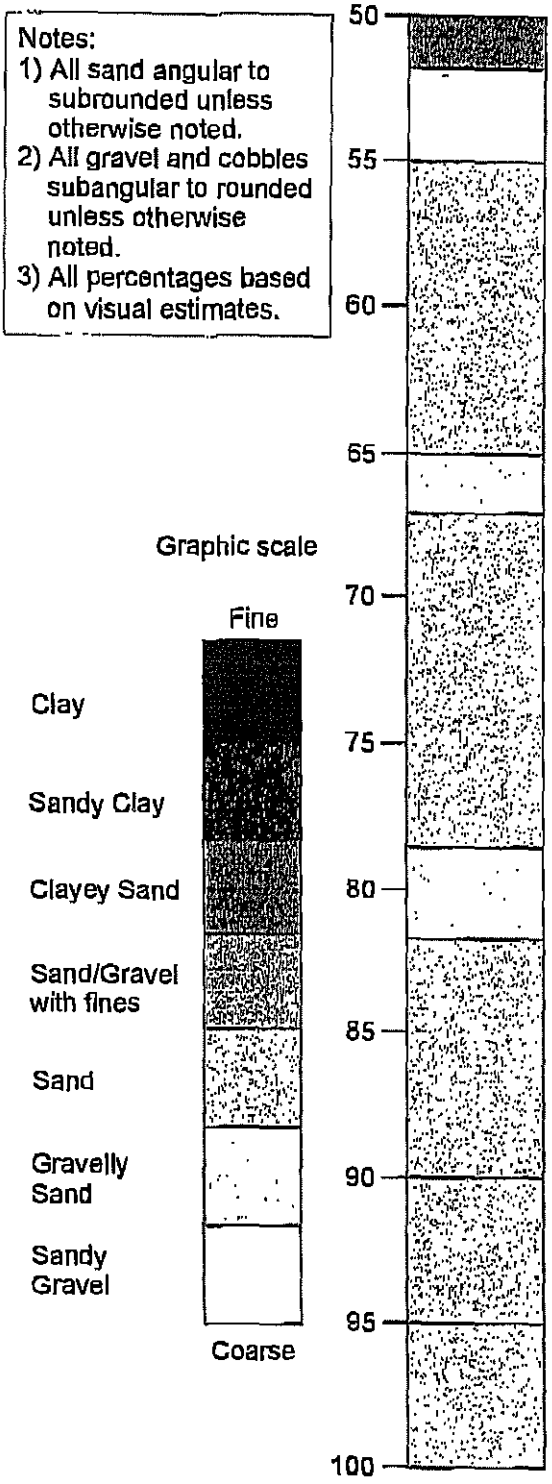
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,066 N (northeast pit)
6,752,926 E

Ground elevation: 1,511'

Hole: R-04-02
Date drilled: 2/4/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



49-52' **Silty Sand with Gravel (SM);** dark yellowish brown (10YR 4/6); mostly fine to medium, micaceous sand, 20% silt, 15% gravel, damp.

52-55' **Gravel with Sand (GW);** dark yellowish brown (10YR 4/6); 80% gravel with gneiss boulder, trace silt as rock flour, humid.

55-65' **Sand with Gravel (SW);** light olive brown (2.5Y 5/3); fine to coarse sand, 15% gravel, mostly moderately to highly weathered clasts, moist.

65-67' **Gravelly Sand (SW);** light olive brown (2.5Y 5/4); fine to coarse sand, 40% gravel with cobbles and gneiss boulder, feldspar pegmatite and quartzite, damp.

67-78' **Sand with Gravel (SW);** olive brown (2.5Y 4/4); fine to coarse sand, 15% fine gravel, mostly subangular to rounded, moderately to highly weathered clasts of schist and coarse grained granitics, moist.

78-82' **Gravelly Sand (SW);** light olive brown (2.5Y 5/4); fine to coarse sand, 40% gravel with cobbles, damp.

82-90' **Sand with Gravel (SW);** light olive brown (2.5Y 5/4); fine to coarse sand, 15% gravel, trace cobbles, trace silt, mostly moderately to highly weathered clasts of mica schist, moist.

90-95' **Sand (SW);** light olive brown (2.5Y 5/4); fine to coarse sand, trace gravel, damp.

95-102' **Sand with Gravel (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 15% gravel, trace cobbles, mostly moderately weathered clasts of schist and granitics, moist.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air.
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-02
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

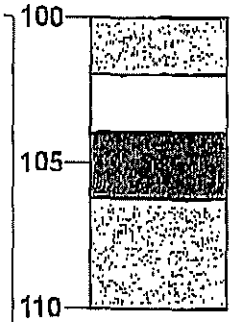
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,066 N
6,752,926 E

Ground elevation: 1,511'

Hole: SB-04-02
Date drilled: 2/17/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



End of hole

No ground water

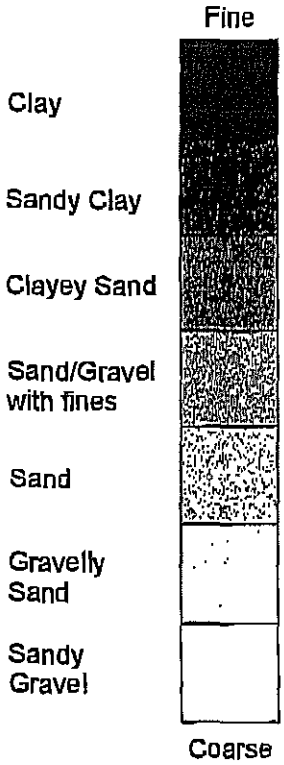
95-102' **Sand with Gravel (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 15% gravel, trace cobbles, mostly moderately weathered clasts of schist and granitics, moist.

102-104' **Sandy Gravel (GW);** yellowish brown (10YR 5/6); fine to coarse sand, 60% gravel with cobbles. Slightly to moderately weathered quartzite and fine grained mafics, with moderately to highly weathered schist and coarse grained granitics, damp.

104-106' **Silty Sand (SM);** dark yellowish brown (10YR 4/6); mostly fine to medium, micaceous sand, 15% silt, trace gravel, damp.

106-110' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 15% gravel, trace silt, moist.

Graphic scale



Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-02
Site: Highland Avenue Plant, San Bernardino, CA

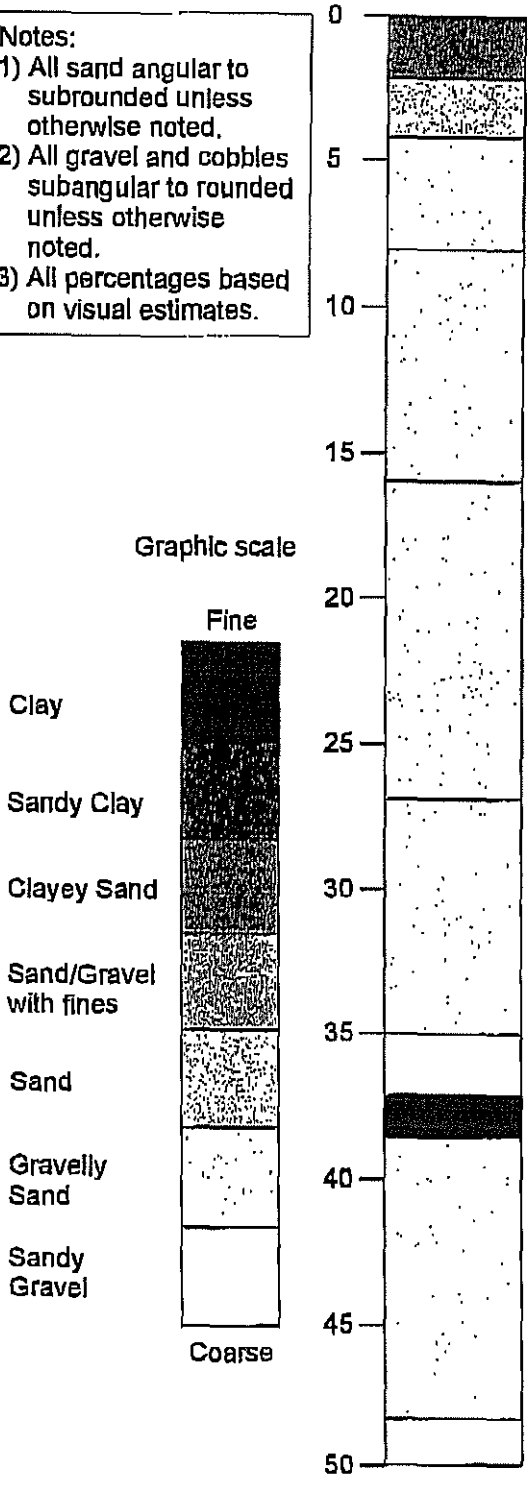
Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,887,579 N
6,753,468 E
Ground elevation: 1,496'

Hole: SB-04-03
Date drilled: 2/17-18/04
Page: 1 of 3

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



0-2' **Silty Gravelly Sand (SM);** light gray (10YR 7/2); fine to coarse sand, 30% gravel, 15% silt, humid.

2-4' **Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, humid.

4-8' **Sand with Gravel (SW);** light yellowish brown (10YR 6/4); fine to coarse sand, 20% gravel with trace cobbles, slightly to moderately weathered quartzite and fine grained mafics with moderately to highly weathered schist and coarse grained granitics, humid.

8-16' **Sand with Gravel (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 15% gravel, humid.

16-27' **Gravelly Sand (SW);** light yellowish brown (10YR 6/4); fine to coarse sand, 35% gravel with cobbles and gneiss boulder. Trace silt as rock flour. Mostly slightly to moderately weathered clasts of granitics, schist, gneiss, and fine grained mafics, humid.

27-35' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 20% gravel and cobbles to 6", humid. Slightly to moderately weathered granitics, feldspar pegmatite, and fine grained mafics.

35-37' **Sandy Gravel (GW);** yellowish brown (10YR 5/4); fine to coarse sand, 60% gravel and cobbles with quartz monzonite boulder, humid.

37-38' **Sandy Silt (ML);** pale brown (10YR 6/3); 40% fine to medium sand, 60% silt, humid.

38-48' **Gravelly Sand (SW);** light olive brown (2.5Y 5/6); fine to coarse sand, 35% gravel with cobbles, mostly slightly to moderately weathered clasts of quartzite, schist, and othoclase-rich coarse grained granitics, humid.

48-54' **Sandy Gravel (GW);** light brownish gray (10YR 6/2); fine to coarse sand, 60% gravel and cobbles with diorite boulder, trace silt as rock flour, humid.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-03
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

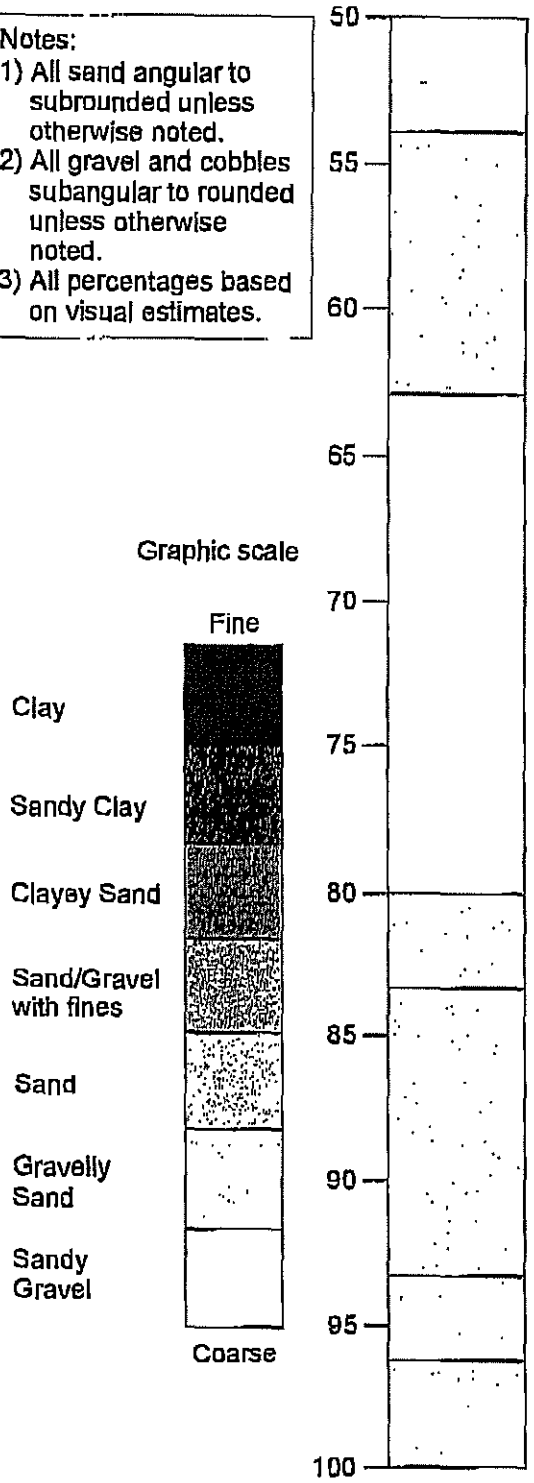
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,887,579 N
6,753,458 E

Ground elevation: 1,496'

Hole: SB-04-03
Date drilled: 2/17-18/04
Page: 2 of 3

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



48-54' **Sandy Gravel (GW);** light brownish gray (10YR 6/2); fine to coarse sand, 60% gravel and cobbles with diorite boulder, trace silt as rock flour, humid.

54-63' **Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 10% gravel, trace cobbles, damp.

63-80' **Sand with Gravel (SW-GW);** light olive brown (2.5Y 5/3); fine to coarse sand, 15% gravel, trace cobbles, trace silt, damp.

80-83' **Sandy Gravel (GW);** light brownish gray (10YR 6/2); fine to coarse sand, 60% gravel and cobbles with quartzite boulder, trace silt as rock flour, humid.

83-93' **Sand with Gravel (SW);** light olive brown (2.5Y 5/4); fine to coarse sand, 10% gravel, mostly moderately to highly weathered clasts <1.5", damp.

93-96' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 30% gravel with trace cobbles, trace silt. Finer gravel moderately to highly weathered clasts, larger clasts mostly slightly to moderately weathered, damp.

96-104' **Sand with Gravel (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 15% gravel, trace cobbles, damp.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-03
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

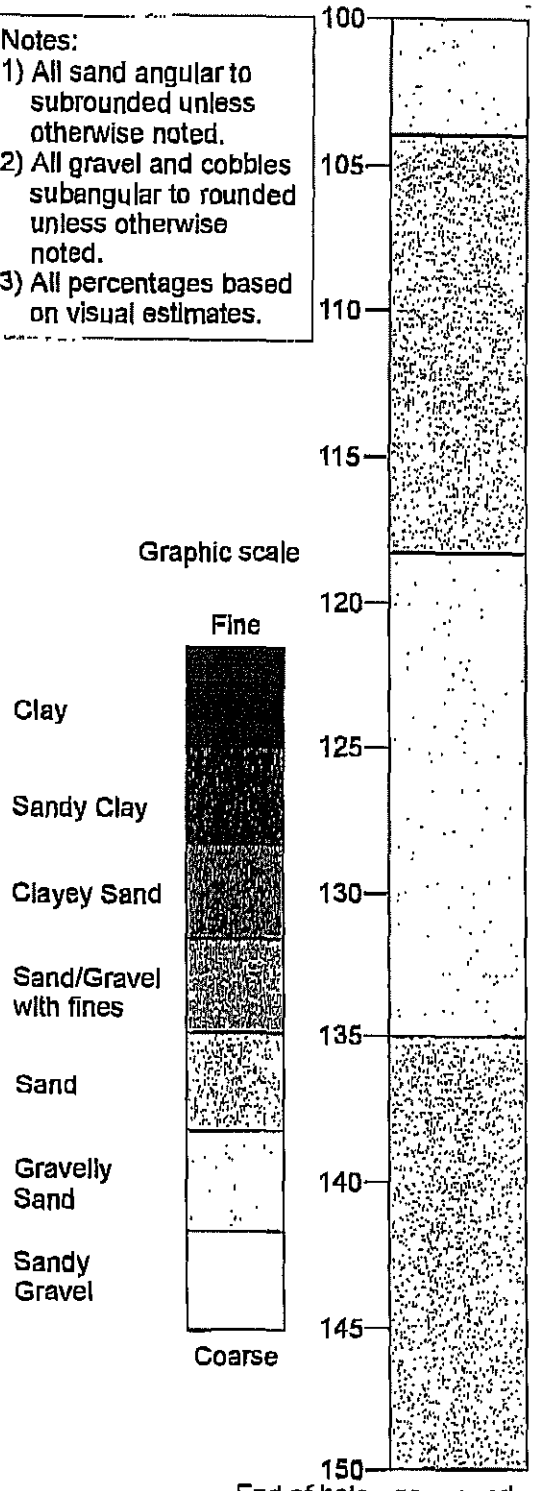
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,887,579 N
6,753,458 E

Ground elevation: 1,496'

Hole: SB-04-03
Date drilled: 2/17-18/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



96-104' **Sand with Gravel (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 15% gravel, trace cobbles, damp.

104-118' **Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, trace gravel, trace cobbles, damp.

118-135' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 15% gravel, trace cobbles, trace weakly cemented conglomerate, damp.

135-150' **Sand (SW);** light olive brown (2.5Y 5/4); fine to coarse sand, trace gravel, damp to moist.

End of hole - no ground water

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-03
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

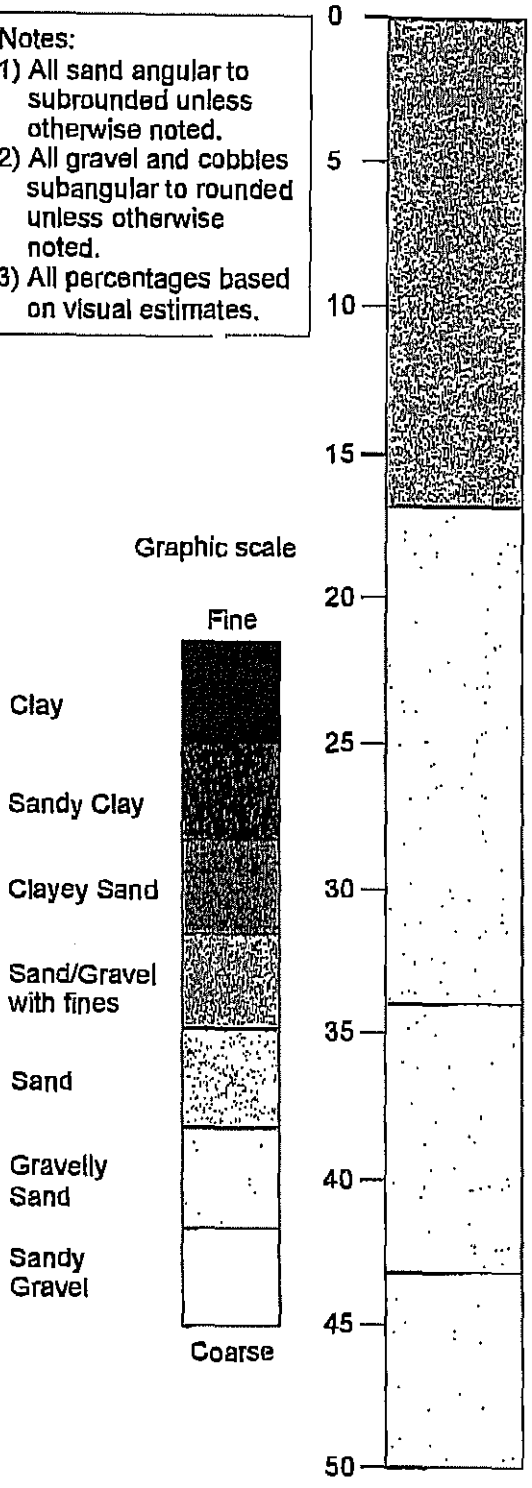
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,978 N
6,755,221 E

Ground elevation: 1,622'

Hole: SB-04-04
Date drilled: 2/18/04
Page: 1 of 4

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



0-17' **Sand with Silt (SW-SM);** dark yellowish brown (10YR 4/6); fine to coarse sand, 10% silt, trace gravel, damp.

17-34' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 15% gravel, slightly to moderately weathered clasts of schist and quartz monzonite, zone of increased weathering from 20-30 feet, humid.

34-43' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 35% gravel with cobbles and quartzite boulder. Mostly slightly to moderately weathered clasts of quartzite, schist, granitics, and fine grained mafics, humid.

43-53' **Sand (SW);** light olive brown (2.5Y 5/4); fine to coarse sand, 10% gravel, humid.

Vulcan Materials Company

Rig: Foremost AR 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-04
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

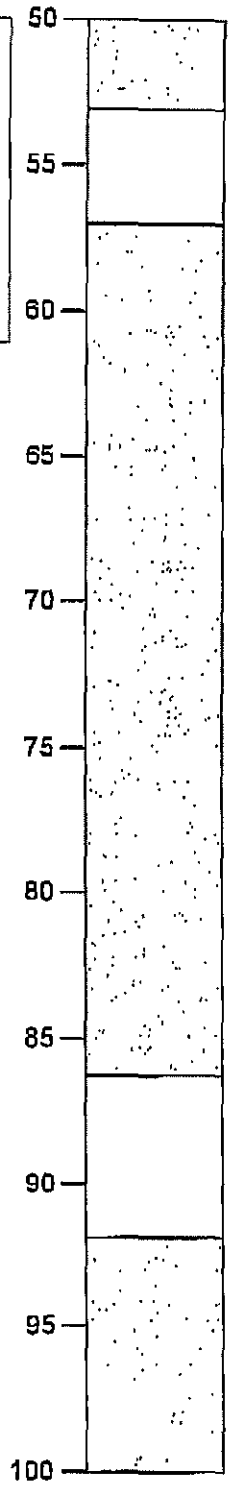
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,978 N
6,755,221 E

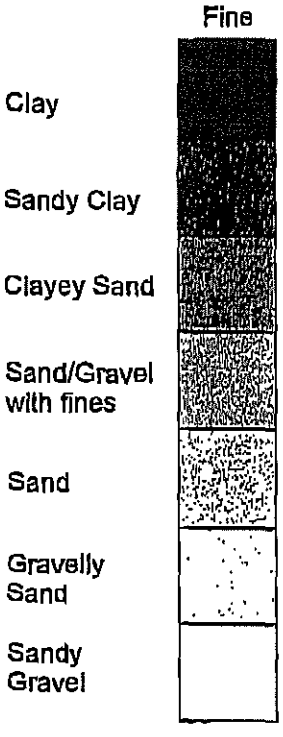
Ground elevation: 1,622'

Hole: SB-04-04
Date drilled: 2/18/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



Graphic scale



43-53' **Sand (SW);** light olive brown (2.5Y 5/4); fine to coarse sand, 10% gravel, humid.

53-57' **Sandy Gravel (GW);** light olive brown (2.5Y 5/4); 40% fine to coarse sand, 55% gravel and cobbles, 5% silt. Gravel clasts subangular to subrounded, slightly to moderately weathered quartzite, schist, coarse grained granitics and fine grained mafics, humid.

57-86' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); 60% fine to coarse sand, 35% gravel and cobbles, 5% silt. Mostly slightly to moderately weathered clasts of quartzite and granitics, with some highly weathered schist, humid.

86-92' **Sand and Gravel (SW-GW);** light olive brown (2.5Y 5/4); 50% fine to coarse sand, 50% gravel and cobbles to 8", trace silt, humid.

92-105' **Gravelly Sand (SW);** yellowish brown (10YR 5/6); 60% fine to coarse sand, 35% gravel and cobbles, 5% silt. Mostly slightly to moderately weathered clasts, humid.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-04
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

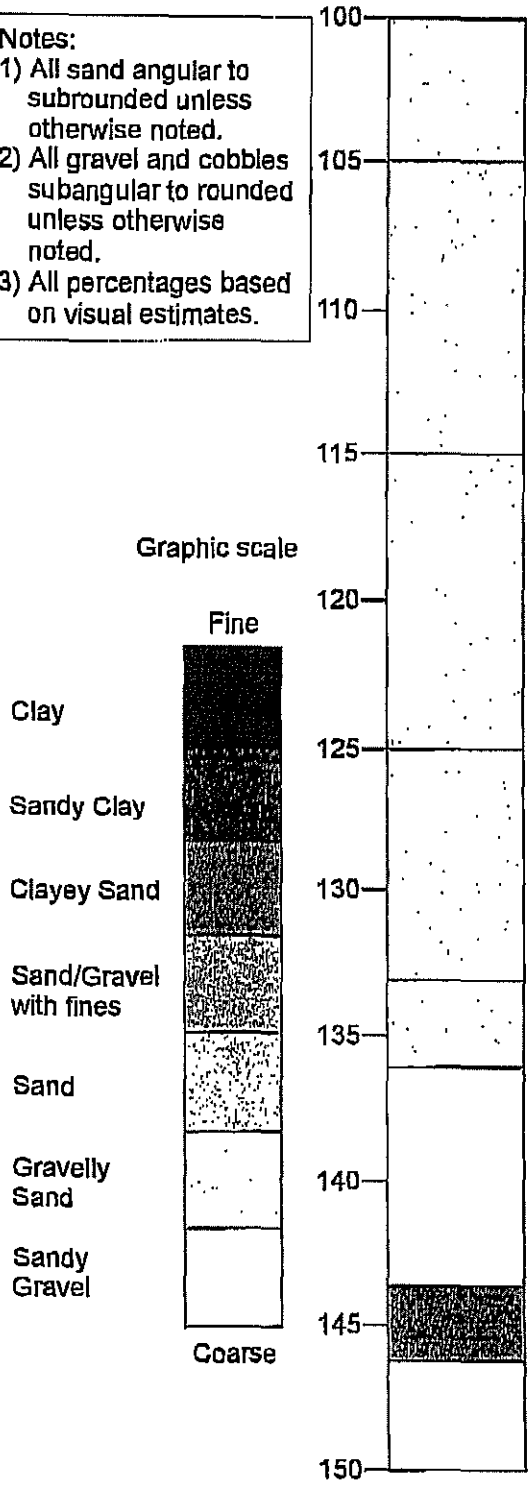
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,978 N
6,756,221 E

Ground elevation: 1,622'

Hole: SB-04-04
Date drilled: 2/18/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



92-105' **Gravelly Sand (SW);** yellowish brown (10YR 5/6); 60% fine to coarse sand, 35% gravel and cobbles, 5% silt. Mostly slightly to moderately weathered clasts, humid.

105-115' **Sand with Gravel (SW);** dark yellowish brown (10YR 4/6); 60% fine to coarse sand, 35% gravel and cobbles, 5% silt. Slightly to moderately weathered clasts of quartzite, with moderately to highly weathered schist, humid.

115-125' **Gravelly Sand (SW);** yellowish brown (10YR 5/6); 65% fine to coarse sand, 30% gravel and cobbles, 5% silt. Mostly slightly to moderately weathered clasts, humid.

125-133' **Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 10% gravel.

133-136' **Gravelly Sand (SW);** yellowish brown (10YR 5/6); 60% fine to coarse sand, 35% gravel and cobbles, 5% silt. Mostly moderately weathered clasts, humid.

136-144' **Sandy Gravel (GW);** yellowish brown (10YR 5/6); 40% fine to coarse sand, 50% gravel, cobbles, and boulders 10% silt (5% as rock flour). Mostly moderately weathered clasts, humid.

144-146' **Silty Sand with Gravel (SM);** dark yellowish brown (10YR 4/6); fine to coarse sand, 20% silt, 15% gravel, damp.

146-152' **Sandy Gravel (GW);** yellowish brown (10YR 5/4); 45% fine to coarse sand, 50% gravel, cobbles, and boulders 5% silt as rock flour. Mostly moderately weathered clasts, humid.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-04
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

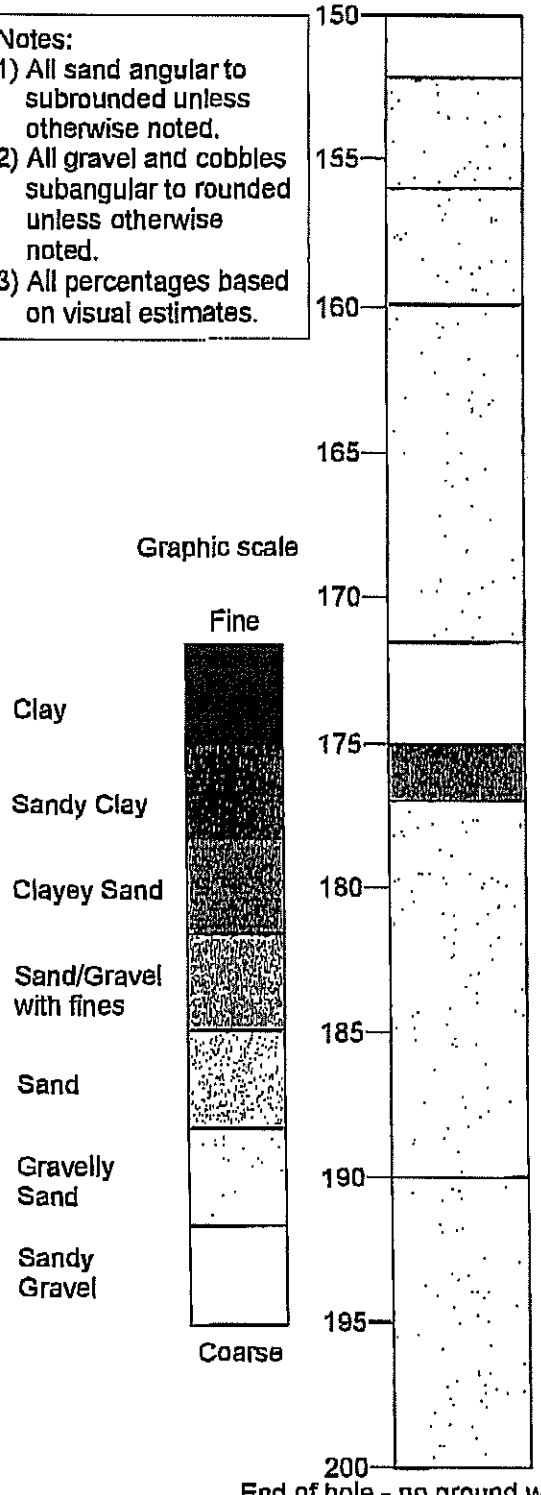
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,978 N
6,755,221 E

Ground elevation: 1,622'

Hole: SB-04-04
Date drilled: 2/18/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



146-152' **Sandy Gravel (GW);** yellowish brown (10YR 5/4); 45% fine to coarse sand, 50% gravel, cobbles, and boulders, 5% silt as rock flour. Mostly moderately weathered clasts, humid.

152-156' **Sand with Gravel (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 15% gravel, damp.

156-160' **Gravelly Sand (SW);** dark yellowish brown (10YR 4/6); 65% fine to coarse sand, 30% gravel and cobbles, 5% silt. Mostly moderately weathered clasts, humid.

160-172' **Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 10% gravel, trace silt, damp.

172-175' **Sandy Gravel with Silt (GW-GC);** light olive brown (2.5Y 5/4); 40% fine to coarse sand, 55% gravel, 5% silt. Moderately weathered quartzite and fine grained mafics, with some highly weathered coarse grained granitics and schist, humid.

175-177' **Silty Sand (SM);** light olive brown (2.5Y 5/4); fine to medium sand, 30% silt, trace gravel, damp.

177-190' **Sand with Gravel (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 20% gravel and cobbles, damp.

190-200' **Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 10% gravel, trace cobbles, damp.

End of hole - no ground water

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-04
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

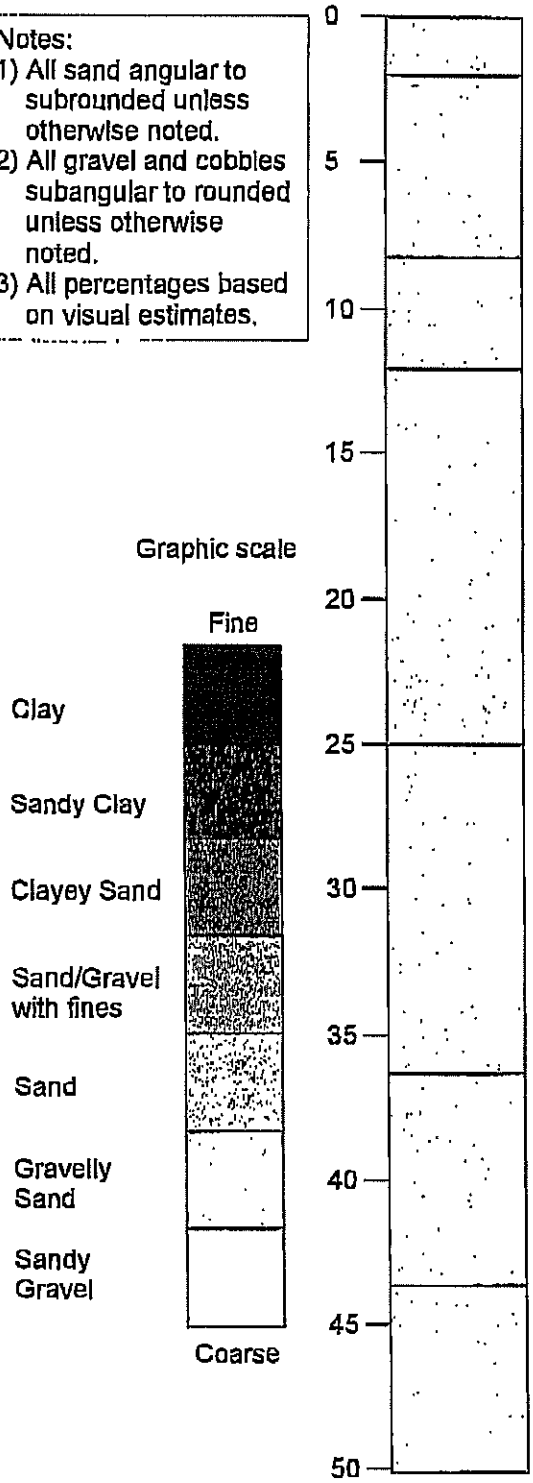
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,169 N
6,754,243 E

Ground elevation: 1,612'

Hole: SB-04-05
Date drilled: 2/19/04
Page: 1 of 5

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



0-2' **Gravelly Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 20% gravel, trace cobbles, damp.

2-8' **Sand with Gravel (SW);** yellowish brown (10YR 5/8); fine to coarse sand, 15% gravel to 2", damp.

8-12' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 30% gravel to 3", trace silt. Mostly slightly to moderately weathered clasts of quartzite, schist, and granitics, humid.

12-25' **Sand with Gravel (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 10% fine gravel, subangular to subrounded clasts, humid.

25-36' **Sand with Gravel (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 25% gravel and cobbles, subangular to subrounded clasts, mostly slightly to moderately weathered quartzite, schist, and granitics, humid.

36-44' **Gravelly Sand (SW);** yellowish brown (10YR 5/6) to olive yellow (2.5Y 4/4); fine to coarse sand, 30% gravel and cobbles, trace silt. Mostly slightly to moderately weathered clasts of quartzite, schist, and granitics, humid.

44-61' **Sand with Gravel (SW);** light yellowish brown (2.5Y 6/4); fine to coarse sand, 15% gravel, trace cobbles at 56 feet, humid.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 8-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-05
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

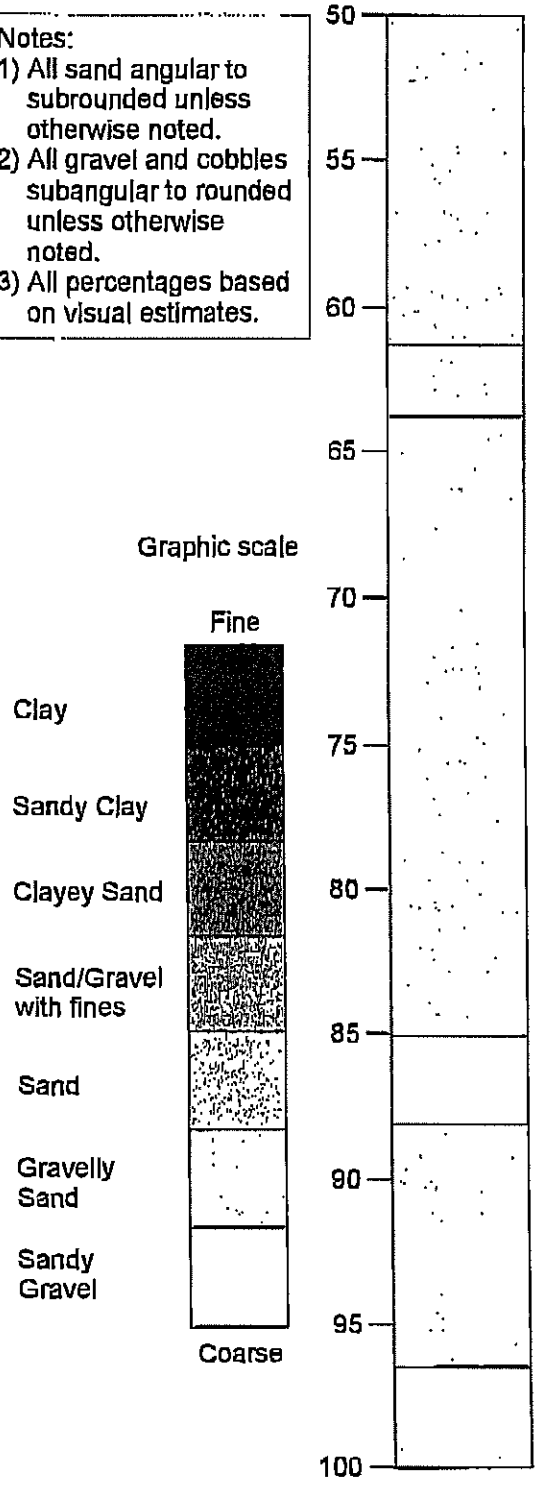
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,169 N
6,754,243 E

Ground elevation: 1,612'

Hole: SB-04-05
Date drilled: 2/19/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



44-61' **Sand with Gravel (SW);** light yellowish brown (2.5Y 6/4); fine to coarse sand, 15% gravel, trace cobbles at 56 feet, humid.

61-64' **Gravelly Sand (SW);** light yellowish brown (2.5Y 6/4); fine to coarse sand, 30% gravel and cobbles to 6", trace silt, humid.

64-85' **Sand with Gravel (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 20% gravel, trace cobbles, trace silt, humid. Subangular to subrounded clasts, mostly slightly to moderately weathered quartzite, fine grained mafics and gneiss, with some moderately to highly weathered schist and coarse grained granitics. Finer gravel (<1.5") more weathered than larger clasts.

85-88' **Sandy Gravel (GW);** light yellowish brown (2.5Y 6/4); fine to coarse sand, 50% gravel and cobbles, schist boulder, trace silt, humid.

88-96' **Sand with Gravel (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 15% gravel, trace silt, humid.

96-103' **Gravelly Sand (SW);** light yellowish brown (2.5Y 6/4); fine to coarse sand, 40% gravel, cobbles, and boulders, trace silt slightly to moderately weathered clasts >1.5", moderately to highly weathered clasts <1.5", humid.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-05
Site: Highland Avenue Plant, San Bernardino, CA

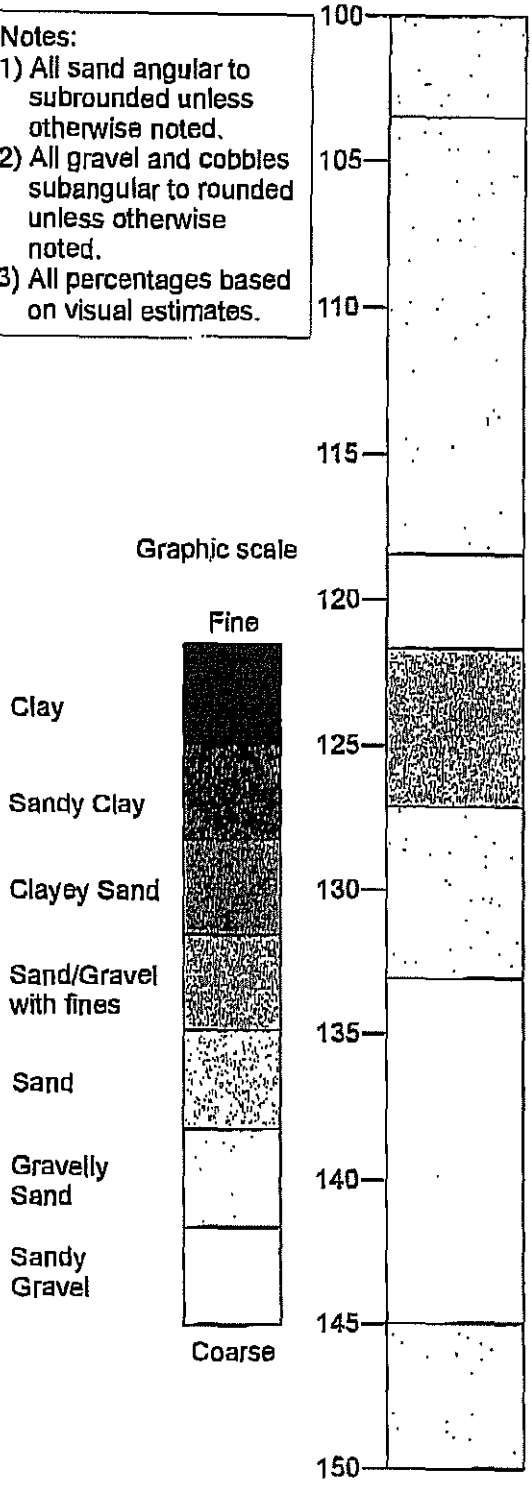
Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,169 N
6,754,243 E
Ground elevation: 1,612'

Hole: SB-04-05
Date drilled: 2/19/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



96-103' **Gravelly Sand (SW);** light yellowish brown (2.5Y 6/4); fine to coarse sand, 40% gravel, cobbles, and boulders, trace silt slightly to moderately weathered clasts >1.5", moderately to highly weathered clasts <1.5", humid.

103-118' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 20% gravel, trace silt, humid.

118-122' **Sandy Gravel (GW);** yellowish brown (10YR 5/6); fine to coarse sand, 50% gravel and cobbles, quartzite boulder, trace silt. Slightly to moderately weathered coarse grained granitics and gneiss, some highly weathered coarse grained gneiss, humid.

122-126' **Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, trace gravel, humid.

126-133' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 20% gravel, trace cobbles, humid.

133-145' **Sandy Gravel (GW);** yellowish brown (10YR 5/4) to light yellowish brown (2.5Y 6/4); 40% fine to coarse sand, 60% gravel and cobbles, granite boulder, trace silt as rock flour. Slightly to moderately weathered granitics and gneiss, humid.

145-153' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 40% gravel, cobbles, and boulders, trace silt. Fine grained mafic and gneiss boulders, with mostly slightly to moderately weathered gravel clasts, humid.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-05
Site: Highland Avenue Plant, San Bernardino, CA

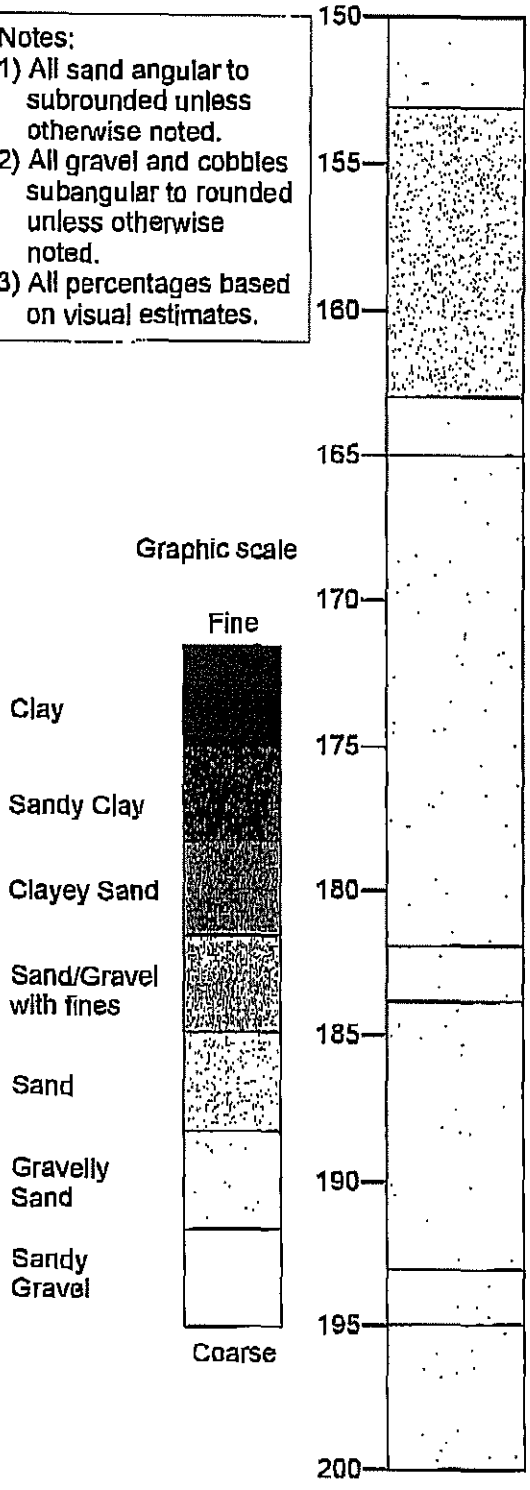
Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,169 N
6,754,243 E
Ground elevation: 1,612'

Hole: SB-04-05
Date drilled: 2/19/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



145-153' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 40% gravel, cobbles, and boulders, trace silt. Fine grained mafic and gneiss boulders, with mostly slightly to moderately weathered gravel clasts, humid.

153-163' **Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, trace gravel to 3", humid.

163-165' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 35% gravel and cobbles to 8", subangular to subrounded clasts, humid.

165-182' **Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 10% gravel, trace cobbles, humid. Sand angular to subrounded, mostly quartz with lesser feldspar (c. 30%), c. 20% mafics.

182-184' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 20% gravel, trace silt, damp.

184-193' **Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 10% gravel, trace cobbles, damp.

193-195' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 30% gravel, trace silt, damp.

195-220' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 15% gravel, damp.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-05
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

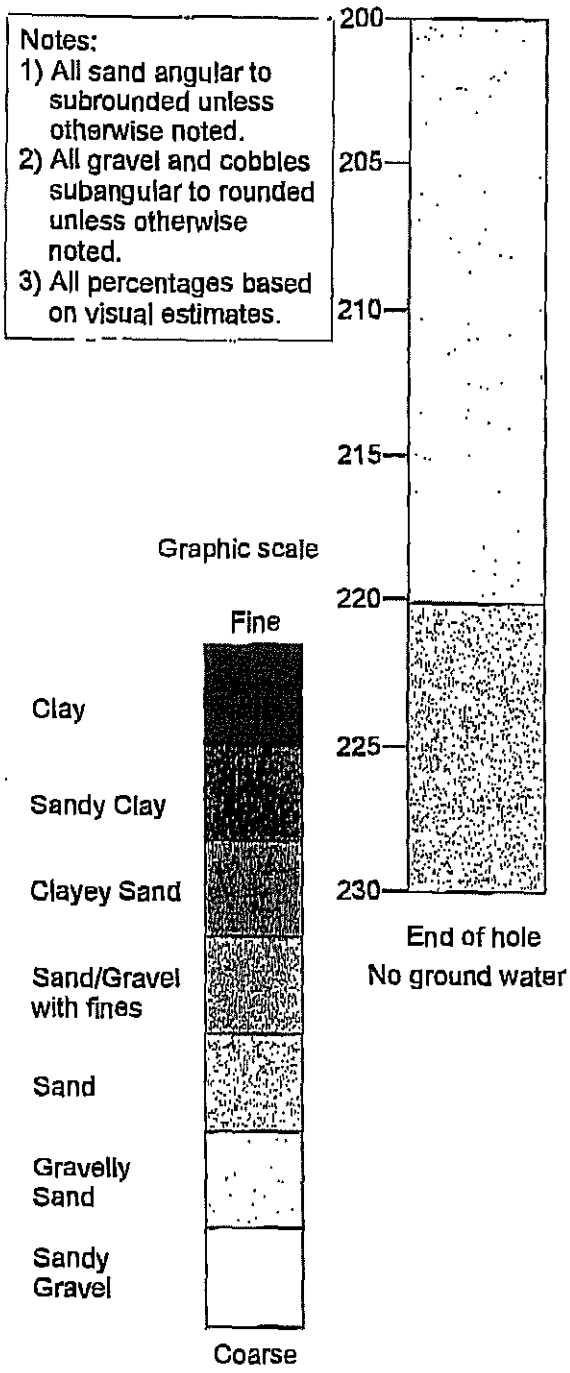
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,888,169 N
6,754,243 E

Ground elevation: 1,612'

Hole: SB-04-05
Date drilled: 2/19/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



195-220' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 10% gravel, damp. Sand angular to subrounded mostly quartz with lesser feldspar (c. 30%), 20% mafics.

220-230' **Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, trace gravel, damp.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-05
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

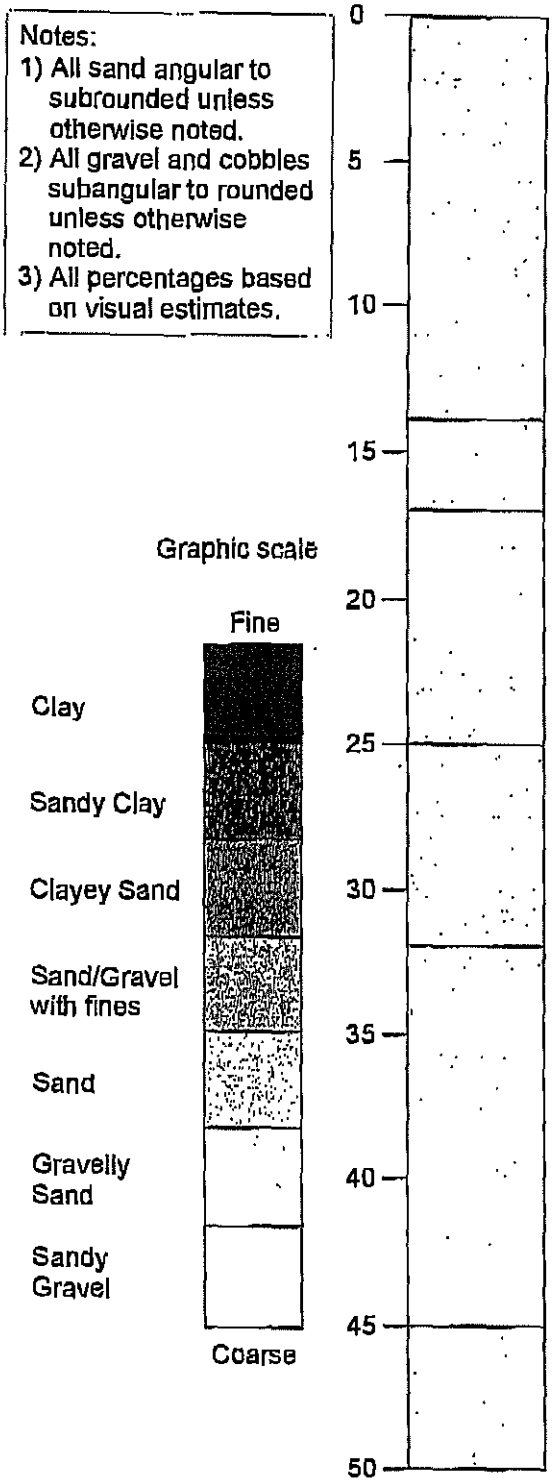
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,886,553 N
6,755,925 E

Ground elevation: 1,566'

Hole: SB-04-06
Date drilled: 2/19/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



0-14' **Sand with Gravel (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 15% gravel, trace cobbles, trace silt, damp.

14-17' **Gravelly Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 30% gravel, trace cobbles. Mostly slightly to moderately weathered clasts of gneiss, quartzite, and schist, humid

17-25' **Sand with Gravel (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 15% fine gravel, humid.

25-32' **Gravelly Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 35% gravel, trace cobbles. Mostly subangular to subrounded, slightly to moderately weathered clasts of gneiss and quartzite, with moderately to highly weathered schist, humid.

32-45' **Sand with Gravel (SW);** olive brown (2.5Y 4/4); fine to coarse sand, 15% gravel, humid.

45-56' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 35% gravel, trace cobbles, trace silt; Mostly moderately weathered clasts of coarse grained granitics and schist, humid.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-06
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

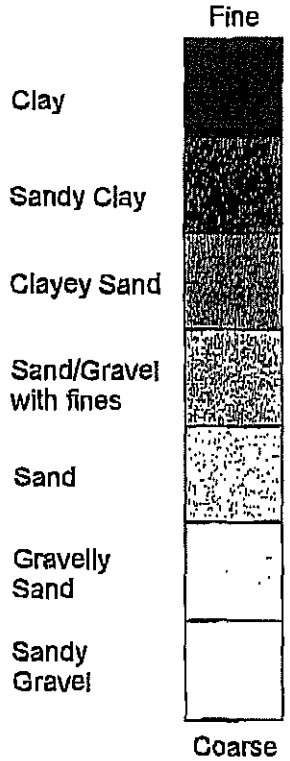
Project: Highland Avenue Plant, San Bernardino, California

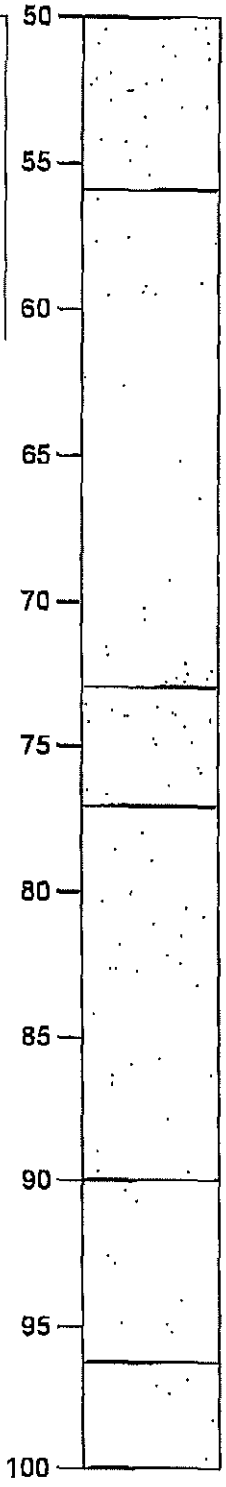
Coordinates: 1,886,563 N
6,755,925 E
Ground elevation: 1,566'

Hole: SB-04-06
Date drilled: 2/19/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.

Graphic scale





45-56' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 35% gravel, trace cobbles, trace silt. Mostly moderately weathered clasts of coarse grained granitics and schist, humid.

56-73' **Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 10% fine gravel, mostly humid.

73-77' **Gravelly Sand (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 30% gravel, trace cobbles, trace silt, humid.

77-90' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 15% gravel to 3", damp.

90-96' **Gravelly Sand (SW);** yellowish brown (10YR 5/4 to 5/6); fine to coarse sand, 30% gravel, trace cobbles, mostly moderately weathered clasts, damp.

96-108' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 20% gravel, trace cobbles, trace silt, damp.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-06
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

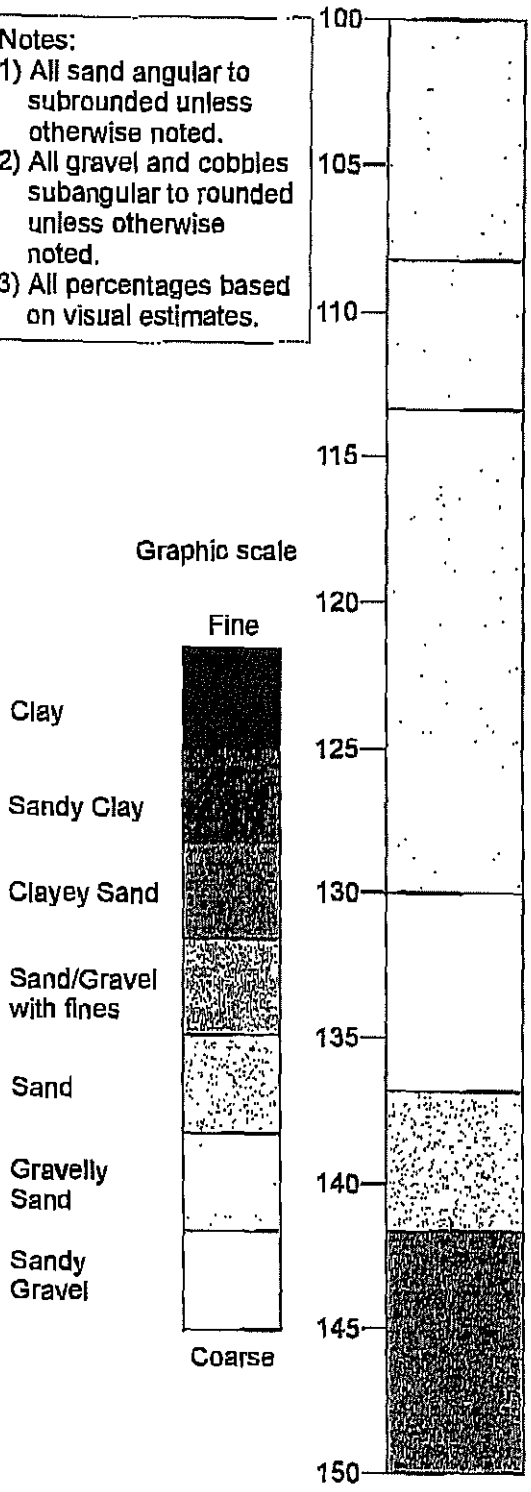
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,886,553 N
6,755,925 E

Ground elevation: 1,566'

Hole: SB-04-06
Date drilled: 2/19/04

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



96-108' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 20% gravel, trace cobbles, trace silt, damp.

108-113' **Sand with Gravel (SW);** yellowish brown (10YR 5/4); fine to coarse sand, 15% gravel, damp.

113-130' **Gravelly Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 30% gravel, trace cobbles, trace silt. Subangular to subrounded clasts, mostly slightly to moderately weathered diorite and gneiss with some moderately to highly weathered schist and coarse grained granitics, damp.

130-137' **Sandy Gravel (GW);** brown (10YR 5/3); fine to coarse sand, 60% gravel and cobbles, trace boulders, mostly slightly to moderately weathered schist and gneiss, damp.

137-142' **Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, trace gravel, damp.

142-150' **Silty Gravelly Sand (SM);** dark yellowish brown (10YR 4/6); fine to coarse sand, 30% gravel, trace cobbles , 15% silt. Slightly to moderately weathered clasts, damp.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 9-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-06
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

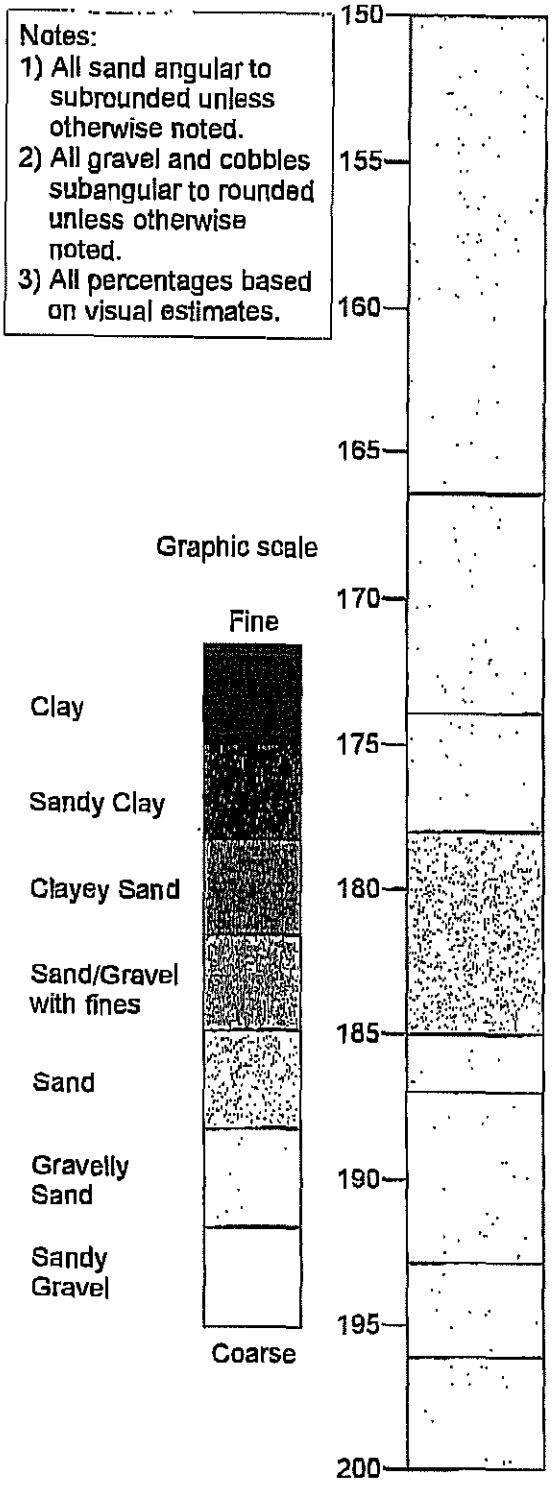
Project: Highland Avenue Plant, San Bernardino, California

Coordinates: 1,886,563 N
6,755,925 E

Ground elevation: 1,566'

Hole: SB-04-06
Date drilled: 2/19/04
Page: 4 of 4

Notes:
1) All sand angular to subrounded unless otherwise noted.
2) All gravel and cobbles subangular to rounded unless otherwise noted.
3) All percentages based on visual estimates.



150-166' **Sand (SM);** yellowish brown (10YR 5/6); fine to coarse sand, 10% gravel, damp.

166-174' **Sand with Gravel (SM);** yellowish brown (10YR 5/6); fine to coarse sand, 20% gravel to 2", mostly moderately weathered quartz pegmatite, gneiss, and schist, some highly weathered finer gravels (<1"), damp.

174-178' **Gravelly Sand (SW);** dark yellowish brown (10YR 4/6); fine to coarse sand, 30% gravel, trace cobbles, damp.

178-185' **Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, trace gravel, damp.

185-187' **Gravelly Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 30% gravel, slightly to moderately weathered gneiss and quartz pegmatite, with moderately to highly weathered schist and coarse grained granitics, damp.

187-193' **Sand (SM);** yellowish brown (10YR 5/6); fine to coarse sand, 10% gravel, damp.

193-196' **Gravelly Sand (SW);** yellowish brown (10YR 5/6); fine to coarse sand, 30% gravel, slightly to moderately weathered gneiss and fine grained mafics, with moderately to highly weathered schist and coarse grained granitics, damp.

196-200' **Sand with Gravel (SM);** yellowish brown (10YR 5/6); fine to coarse sand, 15% gravel, damp.

Vulcan Materials Company

Rig: Foremost AP 1000
Method: Reverse circulation air
Outside Pipe: 8-inch nominal diameter
Inside Pipe: 6-inch nominal diameter

Log of boring: SB-04-06
Site: Highland Avenue Plant, San Bernardino, CA

Recorder: S. Harris, Cleath & Associates
Driller: Layne Christensen

Area M

DUPLICATE
Driller's Copy
Page 1 of 1
Owner's Well No. _____
Date Work Began 12/3/97 Ended 12/19/97
Local Permit Agency San Bernardino County
Permit No. 09049701 Permit Date 9/3/97

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
No. 521246

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
ACN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)
DEPTH TO FIRST WATER _____ (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	30	fine to coarse sand w/gravel
		lenses-½ inch
30	40	same w/rock to 6"
40	50	fine to coarse sand w/gravel
		lenses
50	90	same w/ ¼ gravel lenses
90	140	same w/gravel to 3/4 inch
140	220	fine to coarse sand w/ ½-1½"
		gravel
220	250	fine to coarse sand w/ ¼
		gravel lenses
250	260	fine to coarse sand
260	380	fine to coarse sand w/gravel
380	416	decomposed granite

TOTAL DEPTH OF BORING 416 (Feet)
TOTAL DEPTH OF COMPLETED WELL 370 (Feet)

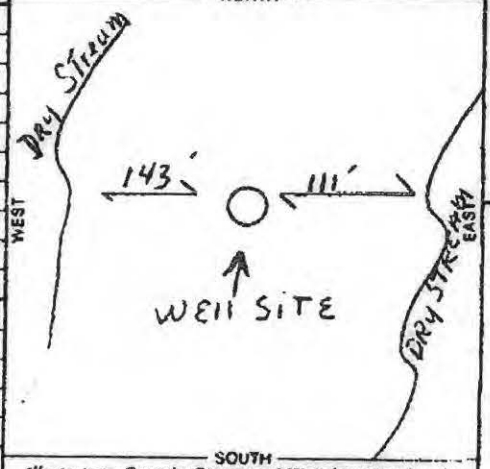
WELL OWNER

Name CalMat
Mailing Address P.O. Box 2950
City Los Angeles State CA Zip 9005

WELL LOCATION

Address _____
City Devore
County San Bernardino
APN Book 262 Page 051 Parcel 30
Township 1N Range 5W Section 11
Latitude _____ DEG. MIN. SEC. NORTH Longitude _____ DEG. MIN. SEC. WEST

LOCATION SKETCH



Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL
MODIFICATION/REPAIR
___ Deepen
___ Other (Specify)
___ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USE(S) (✓)

___ MONITORING
WATER SUPPLY
___ Domestic
___ Public
___ Irrigation
___ Industrial
___ "TEST WELL"
___ CATHODIC PROTECTION
___ OTHER (Specify)

DRILLING METHOD _____ FLUID _____

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL 155 (Ft.) & DATE MEASURED 12/17/97
ESTIMATED YIELD* 1600 (GPM) & TEST TYPE pump
TEST LENGTH 26½ (Hrs.) TOTAL DRAWDOWN 14 (Ft.)
* *May not be representative of a well's long-term yield.* pl 169'

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	COIL-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	220	26"	X				A53B	15.375	.312	
220	300	"		X			MS-screen	15.375	.xxxhd	.080
300	320	"		X			A53B	15.375	.312	.080
320	360	"		X			MS-screen	"	xxxhd	.080
360	370	"	X				A53B	"	.312	
0	60					X	pvc	3.00	sch 40	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	50	X			10 sack
50	376			X	¼ x 10

ATTACHMENTS (✓)

___ Geologic Log
___ Well Construction Diagram
___ Geophysical Log(s)
___ Soil/Water Chemical Analyses
___ Other _____

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Rottman Drlg. Co. LARRY W. ROTTMAN, PRES.
(PERSON, FIRM OR CORPORATION) (TYPED OR PRINTED)
ADDRESS 46491 N. Division St. CITY Lancaster, STATE CA ZIP 93535
Signed _____ WELL DRILLER/AUTHORIZED REPRESENTATIVE
DATE SIGNED 12/23/97
C-57 LICENSE NUMBER 315599

APPENDIX B
Boring Logs (Current Study)

IDENTIFICATION AND DESCRIPTION OF SUBSURFACE MATERIALS

SOIL

Soil description on logs of subsurface explorations are based on Standard Penetration Test results, visual-manual examination of exposed soil and soil samples, and the results of laboratory tests on selected samples. The criteria, descriptive terms and definitions are as follows:

DENSITY OR CONSISTENCY

Density of Cohesionless Soils	Standard Penetration Test (Blows per ft.)	Modified California (Blows per ft.)	Consistency of Cohesive Soils	Penetration Resistance (Blows per ft.)
Very Loose	0-4	0-4	Very Soft	0-2
Loose	5-10	5-12	Soft	3-4
Medium Dense	11-30	13-35	Medium Stiff	5-8
Dense	31-50	36-60	Stiff	9-15
Very Dense	> 50	> 60	Very Stiff	16-30
			Hard	> 30

PENETRATION RESISTANCE

Standard Penetration Test (ASTM D-1586) - Number of blows required to drive a standard 2 in. O.D. split spoon or a modified California sampler 1 ft., with a 140 lb. weight falling freely through 30 in.

COLOR:

Color descriptions based on the Munsell Soil Color Chart

SUPPLEMENTAL SOIL TERMINOLOGY:

Laminae	- 0 to 1/16 in. thick (cohesive)
Parting	- 0 to 1/16 in. thick (granular)
Seam	- 1/16 to 1/2 in. thick
Layer	- 1/2 to 12 in. thick
Stratum	- > 12 in. thick
Pocket	- Small, erratic deposit less than 12 in. size
Lens	- Lenticular deposit larger than a pocket
Occasional	- One or less per 12 in. of thickness
Frequent	- More than one per 12 in. of thickness
Interbedded	- Alternating soil layers of differing composition
Varved	- Alternating thin seams of silt and clay
Mottled	- Variation of color

GEOLOGIC INTERPRETATION

Deposit type - GLACIAL TILL, ALLUVIUM, FILL.....

The natural soils are identified by criteria of Unified Soil Classification System (USCS), with appropriate group symbol in parenthesis for each soil description.
Fill materials may not be classified by USCS criteria.

U.S. Standard Series Seive — Clear Square Sieve Openings

12"	3"	3/4"	4	10	40	200

Boulders	Cobbles	Gravel		Sand			Silts and Clays
		Coarse	Fine	Coarse	Medium	Fine	

305 mm	76 mm	19 mm	4.75 mm	2.00 mm	0.43 mm	0.074 mm

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			Group Symbol	Graphic Symbol	TYPICAL NAMES
Coarse grained soils: more than half is larger than number 200 sieve	Gravels: More than half of coarse fraction is larger than number 4 sieve	Gravels with little or no fines	GW		Well graded gravels, gravel-sand mixtures
			GP		Poorly graded gravels, gravel-sand mixtures
		Gravels with over 12% fines	GM		Silty gravels, poorly graded gravel-sand-silt mixtures
			GC		Clayey gravels, poorly graded gravel-sand-clay mixtures
	Sands: More than half of coarse fraction is smaller than number 4 sieve	Sands with little or no fines	SW		Well graded sands, gravelly sands
			SP		Poorly graded sands, gravelly sands
		Sands with over 12% fines	SM		Silty sands, poorly graded sand-silt mixtures
			SC		Clayey sands, poorly graded sand-clay mixtures
Fined-grained soils: more than half smaller than number 200 sieve	Silts and Clays: Liquid limit 50% or less		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL		Organic clays and organic silty clays of low plasticity
	Silts and Clays: Liquid limit greater than 50%		MH		Inorganic silty, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH		Inorganic clays of high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
Highly organic soils			PT		Peat and other highly organic soils

GENERAL NOTES

1. Logs of subsurface explorations depict soil, rock and groundwater conditions only at the locations specified on the dates indicated. Subsurface conditions may vary at other locations and at other times.

2. Water levels noted on the logs were measured at the times and under the conditions indicated. During test borings, these water levels could have been affected by the introduction of water into the borehole, extraction of tools on other procedures and thus may not reflect actual groundwater level at the test boring location. Groundwater level fluctuations may also occur as a result of variations in precipitation, temperature, season, tides, adjacent construction activities and pumping of water supply wells and construction dewatering systems.

HALEY ALDRICH

MCELENEY, TERRI Printed: 8/28/2018 6:26 PM Layout: 8.5X11 P
J:\GRAPHICS\TEMP\MCELENEY-T\FIELD SERVICES\SUBSURFACE EXPLORATION LOG KEY\HA-SUBSURFACE EXPLORATION KEY2018-0828 SOILS ONLY.DWG

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-01 (HA-6)

Project	Cajon Creek Quarry Phase II Expansion, San Bernardino, California
Client	Vulcan Materials Company
Contractor	Yellow Jacket Drilling Services, LLC

File No.	0132051-005
Sheet No.	1 of 5
Start	7 June 2021
Finish	8 June 2021
Driller	Carlos
H&A Rep.	K. Cato (Vulcan)
Elevation	1525.0
Datum	NAVD88
Location	See Plan

		Drilling Equipment and Procedures
Boring Diameter (in.)	6.0	Rig Make & Model: Terra Sonic TSi 150T
Hammer Type	Automatic Hammer	Bit Type: Sonic Bit
Hammer Weight (lb)	140	Drill Mud: None
Hammer Fall (in.)	30	Casing: Sonic (4-in. ID)
		Hoist/Hammer: Sonic Bit/Automatic Hammer
		PID Make & Model:

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
0							Note: SB-21-01 logged by Vulcan Materials Company. Vegetation and blow sand				1525
					1523.0 2.0						
						SM	Light yellowish brown to yellowish brown, silty SAND, fine to coarse sand				
5						SM	Silty SAND, fine to medium sand				1520
						SM	Silty SAND with gravel, sand fine to coarse				
10											1515
							Rock flour				
15											1510
20							Dark gray				1505
25											1500
							Rock flour				
30						SM	Silty SAND with gravel, black, fine to coarse sand				1495

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sampler Type Legend

SPT - Standard Penetration Test
MCS - Modified California Sampler (2.43-in ID)

Summary

Overburden (ft) 200
Rock Cored (ft)
Samples

Boring No. SB-21-01 (HA-6)

Field Tests: **Dilatancy** : R - Rapid S - Slow N - None **Plasticity** : N - Nonplastic L - Low M - Medium H - High
Toughness : L - Low M - Medium H - High **Dry Strength** : N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-01 (HA-6)
File No. 0132051-005
Sheet No. 2 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
30											1495
35						SM	Silty SAND with gravel, fine gravel with trace coarse gravel				1490
						SM	Silty SAND with gravel. fine to coarse sand				
40							Rock flour				1485
							Rock flour				
45							Rock flour				1480
						SM	Silty SAND with gravel, increasing gravel and rock flour, fine to coarse sand				
50						SM	Silty SAND with gravel, fine gravel, fine to coarse sand, slight decreasing coarse sand				1475
55											1470
60						SM	Silty SAND with gravel				1465
						SM	Silty SAND with gravel, increasing silt, fine to coarse sand				
65						SM	Silty SAND with gravel, increasing gravel, fine to medium sand				1460
						SM	Silty SAND with gravel, slight increasing silt, fine gravel, fine to coarse sand				
70											1455

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-01 (HA-6)
File No. 0132051-005
Sheet No. 3 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
75							Increasing gravel, fine to coarse gravel				1450
80							Rock flour				1445
						SM	Silty SAND, very fine to medium sand				
85											1440
90											1435
95											1430
100						SM	Silty SAND with gravel, increasing gravel, fine to coarse sand				1425
						SM	Silty SAND, very fine to medium sand				
105						SM	Silty SAND, fine to coarse sand, decreasing silt				1420
							Increasing silt				
110						SM	Silty SAND with gravel, fine to coarse gravel, fine to coarse sand				1415
115											1410
						SM	Fine to coarse sand, slight increasing coarse sand Rock flour				

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-01 (HA-6)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-01 (HA-6)
File No. 0132051-005
Sheet No. 4 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
120					1404.0						1405
					121.0	ML	Sandy SILT				
					1403.0						
					122.0	SM	Silty SAND with gravel, decreasing gravel, fine to coarse sand Rock flour				
125											1400
130											1395
135							Rock flour				1390
140							Increasing gravel				1385
145											1380
150						SM	Silty SAND with gravel, increasing gravel, fine to coarse sand				1375
						SM	Silty SAND with gravel, fine gravel with trace coarse gravel, increasing coarse sand, fine to coarse clean granitic sands				
155											1370
160							Slight increasing gravels Rock flour				1365

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-01 (HA-6)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-01 (HA-6)
File No. 0132051-005
Sheet No. 5 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
165							Mostly fine gravel				1360
170											1355
175											1350
180							Gravel				1345
							Decreasing silt, fine to coarse sand				
185											1340
190											1335
195							Rock flour				1330
							Increasing silt, fine to coarse sand				
200					1325.0 200.0		BOTTOM OF EXPLORATION 200.0 FT				1325
205											1320

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-01 (HA-6)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-02 (HA-5)

Project	Cajon Creek Quarry Phase II Expansion, San Bernardino, California
Client	Vulcan Materials Company
Contractor	Yellow Jacket Drilling Services, LLC

File No.	0132051-005
Sheet No.	1 of 5
Start	9 June 2021
Finish	10 June 2021
Driller	Carlos
H&A Rep.	K. Cato (Vulcan)
Elevation	1539.0
Datum	NAVD88
Location	See Plan

		Drilling Equipment and Procedures
Boring Diameter (in.)	6.0	Rig Make & Model: Terra Sonic TSi 150T
Hammer Type	Automatic Hammer	Bit Type: Sonic Bit
Hammer Weight (lb)	140	Drill Mud: None
Hammer Fall (in.)	30	Casing: Sonic (4-in. ID)
		Hoist/Hammer: Sonic Bit/Automatic Hammer
		PID Make & Model:

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
0							Note: SB-21-02 logged by Vulcan Materials Company. Hand auger to 6 ft				1539
5					1533.0 6.0	SM	Silty SAND with gravel, fine to coarse sand, subround to round.				1535
10											1530
15							Rock flour				1525
20						SM	Silty sand with gravel, gravels increasing, fine to coarse sand				1520
25							Slight increase of silt				1515
30											1510

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sampler Type Legend

SPT - Standard Penetration Test
MCS - Modified California Sampler (2.43-in ID)

Summary

Overburden (ft) 200
Rock Cored (ft)
Samples

Boring No. SB-21-02 (HA-5)

Field Tests: **Dilatancy** : R - Rapid S - Slow N - None **Plasticity** : N - Nonplastic L - Low M - Medium H - High
Toughness : L - Low M - Medium H - High **Dry Strength** : N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-02 (HA-5)
File No. 0132051-005
Sheet No. 2 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
30											
							Decreasing gravels				
						SM	Silty SAND with gravel, decreasing gravel, fine to coarse sand, increasing silt				1505
35											
							Rock flour				
											1500
40							Decreasing gravels				
											1495
45						SM	Silty SAND with gravel, slight increasing gravels, fine to coarse sand				
							Rock flour				1490
50											
						SM	Silty SAND with gravel, gravel decreasing, fine to coarse sand				1485
55											
						SM	Silty SAND with gravel, gravels increasing, fine to coarse sand				1480
60											
											1475
65											
											1470
70											
											1465

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-02 (HA-5)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-02 (HA-5)
File No. 0132051-005
Sheet No. 3 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
75											
											1460
80											
											1455
85						SM	Silty SAND with gravel, decreasing gravel, fine to coarse sand				
							Rock flour				1450
						SM	Silty SAND with gravel, gravel increasing				
90											
						SM	Silty SAND with gravel, fine to coarse sand				
						SM	Silty SAND with gravel, increasing gravel, fine to coarse sand				1445
95											
											1440
100											
											1435
105											
							Increasing silt				
							Driller inadvertently discarded sample from 108 to 110 ft				1430
110							Rock flour				
											1425
						SM	Silty SAND with gravel, fine to coarse sand				
115											
											1420

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-02 (HA-5)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-02 (HA-5)
File No. 0132051-005
Sheet No. 4 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
120						SM	Silty SAND with gravel, gravel increasing, fine to coarse sand				1415
125							Weakly indurated silt, rock flour, increasing silt				1410
130							Rock flour, fine to coarse sand				1405
135											1400
140							Fine to medium sand grains, fairly clean, rock flour				1395
145							Increasing gravel				1390
150						SM	Silty SAND with gravel, gravels increasing				1385
155							Decreasing gravels, fairly clean sand, fine to coarse sand				1380
160							Slight increasing silt/flour, increasing gravel				1375
					1375.0		Rock flour Gravels decreasing, fine to coarse sand				

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-02 (HA-5)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-02 (HA-5)
File No. 0132051-005
Sheet No. 5 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
165					164.0	ML	Sandy silt to silty SAND interbedded, increasing fine to medium sand				
					1370.0						1370
170					169.0	SM	Silty SAND with gravel, fine to coarse sand, increasing fine to medium sand				
175					1363.0						1365
					176.0	ML	Very pale yellow, sandy SILT, very fine to fine sand				
180						ML	Yellowish brown, SILT with weak clay seam				1360
							Yellowish brown, sandy SILT, slight increasing sand content				
185											1355
190							Sandy SILT with gravel				1350
195											1345
200					1339.0						1340
					200.0		BOTTOM OF EXPLORATION 200.0 FT				
205											1335

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-02 (HA-5)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-03 (HA-4)

Project	Cajon Creek Quarry Phase II Expansion, San Bernardino, California
Client	Vulcan Materials Company
Contractor	Yellow Jacket Drilling Services, LLC

File No.	0132051-005
Sheet No.	1 of 7
Start	16 June 2021
Finish	17 June 2021
Driller	Carlos
H&A Rep.	K. Neill
Elevation	1559.0
Datum	NAVD88
Location	See Plan

Drilling Equipment and Procedures

Boring Diameter (in.)	6.0
Hammer Type	Automatic Hammer
Hammer Weight (lb)	140
Hammer Fall (in.)	30

Rig Make & Model: Terra Sonic TSi 150T
Bit Type: Sonic Bit
Drill Mud: None
Casing: Sonic (4-in. ID)
Hoist/Hammer: Sonic Bit/Automatic Hammer
PID Make & Model:

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
0							Note: SB-21-03 logged by Vulcan Materials Company from 0 to 195.0 ft. Hand auger to 6 ft, no sample				1555
5					1553.0 6.0	SM	Brown, silty SAND, very fine to medium sand				
						SM	Silty SAND with gravel, brown. fine to coarse sand				1550
10							Rock flour				1545
15							Silty SAND, fine to medium sand				
							Rock flour				1540
20							Increasing fine gravel content				1535
25							Rock flour				1530
30											

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
6/17/2021	-	-	270	270	None

Sampler Type Legend

SPT - Standard Penetration Test
MCS - Modified California Sampler (2.43-in ID)

Summary

Overburden (ft)	270
Rock Cored (ft)	
Samples	7

Boring No. SB-21-03 (HA-4)

Field Tests:
Dilatancy : R - Rapid S - Slow N - None
Toughness : L - Low M - Medium H - High
Plasticity : N - Nonplastic L - Low M - Medium H - High
Dry Strength : N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-03 (HA-4)
File No. 0132051-005
Sheet No. 2 of 7

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
30											
							Rock flour				1525
35											
											1520
40							Rock flour				
							Decreasing gravel content				
						SM	Silty SAND with gravel, fine to coarse sand				1515
45											
							Decreasing coarse sand				
						SM	Silty SAND with gravel, fine to coarse sand				1510
50											
						SM	Rock flour, fine to coarse sand				1505
55											
							Very fine to medium sand				1500
60											
							Slight increase in gravels				1495
65											
						SM	Silty SAND with gravel, fine to coarse sand, increasing silt				1490
70											
							Broken angular rock fragments				1485

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-03 (HA-4)
File No. 0132051-005
Sheet No. 3 of 7

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
75											
											1480
80							Decreasing gravel Rock flour				
											1475
85							Decreasing gravel. fine to coarse gravel to 2 in. mps				
											1470
90											
							Rock flour				1465
95											
						SM	Silty SAND with gravel, fine gravel with trace coarse gravel				1460
100											
											1455
105											
							Increasing silt, decreasing gravel, weakly indurated				1450
							Decreasing coarse sand, fine to medium sand				
110							Increasing gravel				
											1445
115											
						SM	Silty SAND with gravel, gravel slighty weathered with trace moderately weathered, coarse to fine sand				
											1440

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-03 (HA-4)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-03 (HA-4)
File No. 0132051-005
Sheet No. 4 of 7

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
120							Fine to medium sand, decreased gravel				
											1435
125							Increasing gravel, coarse gravel and cobbles up to 4 in. mps, increasing rock flour to 137 ft, fine to coarse sand				
											1430
130							Rock flour				
											1425
135											
							Fine to coarse sand, rock flour				1420
140							Broke rock, rock flour				
											1415
145							Broken fragments				
							Decreasing gravel				1410
150						SM	Silty SAND with gravel, fine to coarse gravel, fine to coarse sand, subrounded to rounded				
											1405
155											
											1400
160											
											1395

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-03 (HA-4)
File No. 0132051-005
Sheet No. 5 of 7

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
165							Increasing silt, fine to coarse sand				
					1393.0 166.0	ML	Sandy SILT with gravel, fine to coarse sand				1390
170							Rock flour				
					1388.0 171.0	SM	Increasing very fine to fine sand Silty SAND with gravel, fine to coarse sand				1385
175											
											1380
180											
											1375
185							Decreasing gravel content				
											1370
190							Rock flour, gravel content				
											1365
195					1364.0 195.0	SM	Very fine to fine sand Note: Logged by Haley & Aldrich starting at 195.0 ft. Gray, silty SAND, moist, mostly fine to medium sand, little coarse sand, fine gravel and sand				
							Coarsens down sequence				1360
							Rock flour				
							Increased gravels, subrounded to rounded, 2 in. mps				
200						SM	Gray, silty SAND with gravel, moist, mostly fine to medium sand, some fine gravel, little coarse sand and fines				
							Rock flour				1355
205							Gravel lens, coarse gravel up to 3 in. mps				

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-03 (HA-4)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-03 (HA-4)
File No. 0132051-005
Sheet No. 6 of 7

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
					1349.0	ML	Silt lens ~6-in. thick				1350
210					210.0	SM	Gray, silty SAND, moist, fine to coarse sand, little fines, little coarse and fine gravel				
							Gravel lens				
							Gravel lens				1345
215							Fines down sequence				
						SM	Yellow brown, silty SAND, moist, mostly fine to medium sand, some non plastic fines, few coarse sand, few fine gravel, micas				
220											1340
						SM	Pale brown, silty SAND, moist, mostly fine sand, little medium to coarse sand, few gravel, few fines				1335
225							Rock flour				
							Fines down sequence				
					1329.0	SM	Pale brown, silty SAND, moist, mostly fine sand, some non plastic fines, little medium to coarse sand, trace gravel				1330
230	SPT	HA-4-230-231.5	5	50/5"	230.0	SM	Very dense gray, silty SAND, moist, mostly fine sand, non plastic fines, micas, gravel 4%, sand 71%, fines 25%		3.6	25.0	
							No gravel and coarse sand				
235	SPT	HA-4-235-236.5	10	43 50/4"			Increased fines content		3.6	13.1	1325
					1321.0						
					238.0	ML	Dark yellowish brown, sandy SILT, moist, mostly non plastic fines, some fine sand, trace medium sand				
					1319.0						1320
240	SPT	HA-4-240-241.5	9	22 50/3"	240.0	CL	Hard yellow, sandy lean CLAY, moist, fine sand, plastic fines, micas, mottling in upper section, thick unit, no bedding, iron oxides, gravel 1%, sand 38%, fines 61%		11.0	61.0	
											1315
					1314.0		Gradational contact - interbedded CL/SM				
245	SPT	HA-4-245-246.5	4	50/4"	245.0	SM	Very dense yellowish brown, silty SAND, moist, non plastic fines, some fine sand, iron oxidation, micas Interbedded SM layers ~4-in. thick Color change at 247 ft to brown		8.6	36.5	
						SM	Yellow, silty SAND, moist, mostly fine to coarse sand, plastic fines, gravel 10%, sand 51%, fines 39%				1310
250	SPT	HA-4-250-251.5	9	42 50/3"			Rig chatter, hard drilling		6.1	39.0	
					1307.0						
					252.0	ML	Yellowish brown to gray mottling, sandy SILT to SILTSTONE, moist, mostly non plastic fines, little fine sand, trace medium sand, fine to very fine bedding, iron oxide				

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-03 (HA-4)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-03 (HA-4)
File No. 0132051-005
Sheet No. 7 of 7

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
255							Rock flour				1305
							Similar to above, highly fractured siltstone				
					1300.0						
260					259.0	ML	Hard dark yellowish brown, sandy SILT, moist, fine to coarse sand, non plastic fines, little fine (subangular) gravel, iron oxide staining, micas				1300
	SPT	HA-4-260-261.5	8	40 50/2"					8.1	60.1	
						ML	Brownish yellow, sandy SILT, moist, mostly non plastic fines, little fine sand, mottling along laminae bedding				1295
265					1293.0						
					266.0	SM	Very dense light yellowish brown, silty SAND with gravel, moist, mostly fine sand, some non plastic fines, few medium to coarse sand and gravel, quartz present				
							Hard drilling, rig chatter				
							Rock flour				1290
270	SPT	HA-4-270-271.5	10	38 50/4"			Gravel 22%, sand 40%, fines 38%		8.4	38.0	
					1288.2						
					270.8		BOTTOM OF EXPLORATION 270.8 FT				1285
275											
											1280
280											
											1275
285											
											1270
290											
											1265
295											

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-03 (HA-4)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-04 (HA-3)

Project	Cajon Creek Quarry Phase II Expansion, San Bernardino, California
Client	Vulcan Materials Company
Contractor	Yellow Jacket Drilling Services, LLC

File No.	0132051-005
Sheet No.	1 of 5
Start	22 June 2021
Finish	22 June 2021
Driller	Carlos
H&A Rep.	K. Cato (Vulcan)
Elevation	1554.0
Datum	NAVD88
Location	See Plan

		Drilling Equipment and Procedures
Boring Diameter (in.)	6.0	Rig Make & Model: Terra Sonic TSi 150T
Hammer Type	Automatic Hammer	Bit Type: Sonic Bit
Hammer Weight (lb)	140	Drill Mud: None
Hammer Fall (in.)	30	Casing: Sonic (4-in. ID)
		Hoist/Hammer: Sonic Bit/Automatic Hammer
		PID Make & Model:

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
0							Note: SB-21-04 logged by Vulcan Materials Company from 0 to 85.0 ft. Blow sand, roots and vegetation				1550
5					1548.0 6.0	SM	Silty SAND with gravel				1545
10											1540
15							Rock flour Increasing silt Decreasing gravels Fine to medium sand				1535
20							Fine to coarse sand Increased gravel				1530
25							Fine to coarse sand				1525
30							Gravel decreases				

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sampler Type Legend

SPT - Standard Penetration Test
MCS - Modified California Sampler (2.43-in ID)

Summary

Overburden (ft) 200
Rock Cored (ft)
Samples

Boring No. SB-21-04 (HA-3)

Field Tests:

Dilatancy : R - Rapid S - Slow N - None
Toughness : L - Low M - Medium H - High

Plasticity : N - Nonplastic L - Low M - Medium H - High
Dry Strength : N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-04 (HA-3)
File No. 0132051-005
Sheet No. 2 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
30						SM	Silty SAND with gravel				
							Rock flour				1520
35							Rock flour				
											1515
40											
											1510
45							Increasing gravel				
						SM	1 in silty clay seam, slightly elastic Silty SAND with gravel				
											1505
50							Fine to coarse sand				
											1500
55							Fine to medium clean granitic sand				
											1495
60											
							Rock flour				1490
65							Fine to medium sand, granitic quartz rich sand				
											1485
70							Fine gravel with trace coarse gravel				
											1480

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-04 (HA-3)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-04 (HA-3)
File No. 0132051-005
Sheet No. 3 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
75						SM	Silty SAND with gravel				1475
80							Fine to medium granitic clean sand				
							Rock flour				1470
85							Fine to coarse sand				
											1465
90							Rock flour				
											1460
95							Fine to coarse sand, slight increase in coarse sand				
											1455
100											
											1450
105											
											1445
110							Rock flour				
											1440
115							Rock flour				
											1435

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-04 (HA-3)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-04 (HA-3)
File No. 0132051-005
Sheet No. 4 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
120							Rig chatter				
							Rock flour				
							Fine to coarse sand				
							Rock flour				1430
125											
											1425
130							Rock flour				
											1420
135							Increasing gravel				
							Rock flour				
							Decreasing gravel				1415
140							SAND with silt, fine to medium sand				
						SM	Silty SAND with gravel, fine to coarse sand				
							Increasing gravel				1410
145							Rock flour				
							Decomposed to severely weathered granite				1405
150						SM	Silty SAND with gravel, increasing gravel				
											1400
155							Increase in coarse sand				
											1395
160							Decrease in gravel				
							Increasing gravels				1390

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-04 (HA-3)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-04 (HA-3)
File No. 0132051-005
Sheet No. 5 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
165							Rock flour				
							Increase in fine to medium sand				1385
170											
											1380
175							Rock flour				
											1375
180						SM	Silty SAND with gravel				
											1370
185											
							Increasing gravel				1365
							Decomposed schist and granite				
190											
											1360
195											
											1355
200					1354.0						
					200.0		BOTTOM OF EXPLORATION 200.0 FT				1350
205											

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-04 (HA-3)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-05 (HA-2)

Project	Cajon Creek Quarry Phase II Expansion, San Bernardino, California
Client	Vulcan Materials Company
Contractor	Yellow Jacket Drilling Services, LLC

		Drilling Equipment and Procedures
Boring Diameter (in.)	6.0	Rig Make & Model: Terra Sonic TSi 150T
Hammer Type	Automatic Hammer	Bit Type: Sonic Bit
Hammer Weight (lb)	140	Drill Mud: None
Hammer Fall (in.)	30	Casing: Sonic (4-in. ID)
		Hoist/Hammer: Sonic Bit/Automatic Hammer
		PID Make & Model:

File No.	0132051-005
Sheet No.	1 of 5
Start	16 June 2021
Finish	23 June 2021
Driller	Carlos
H&A Rep.	K. Neill
Elevation	1454.0
Datum	NAVD88
Location	See Plan

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
0						SM	Note: SB-21-05 logged by Vulcan Materials Company from 0 to 85.0 ft. Silty SAND with gravel				
							Rock flour				1450
5							Rock flour				
											1445
10											
											1440
15							Rock flour				
											1435
20							Rock flour				
						SM	Silty SAND with gravel, fine gravels				
							Slight increase in gravel				1430
25											
							Slight increase in silt				1425
30											

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
6/17/2021	-	-	175	175	163

Sampler Type Legend

SPT - Standard Penetration Test
MCS - Modified California Sampler (2.43-in ID)

Summary

Overburden (ft)	175
Rock Cored (ft)	
Samples	16

Boring No. SB-21-05 (HA-2)

Field Tests:

Dilatancy : R - Rapid S - Slow N - None
Toughness : L - Low M - Medium H - High
Plasticity : N - Nonplastic L - Low M - Medium H - High
Dry Strength : N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-05 (HA-2)
File No. 0132051-005
Sheet No. 2 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
30						SM	Silty SAND with gravel				
							Slight increase in silt				1420
35							Decomposed schist				
											1415
40							Decomposed granite				
							Slight increase in gravels				1410
45											
											1405
50							Decreasing coarse sand, very fine to coarse sand				
											1400
55											
											1395
60											
							Slight increase in gravel				1390
65											
											1385
70							Fine to coarse sand Slight increase in gravels Fine to coarse sand				
											1380

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-05 (HA-2)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-05 (HA-2)
File No. 0132051-005
Sheet No. 3 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
75						SM	Silty SAND with gravel				
							Rock flour				1375
80							Increasing gravel				
							Severely weathered schist				1370
					1369.0		Note: Logged by Haley & Aldrich starting at 85.0 feet.				
85	SPT	HA-2-85-86.5	5	50/5"	85.0	SC	Brown, clayey SAND, moist, medium dense, mostly fine to medium sand, plastic fines, few coarse sand, fine gravel (subrounded to rounded), granitic, micas, gravel 2%, sand 56%, fines 42%		9.3	42.0	
							Coarsens down sequence				
							Rock flour, hard drilling				1365
					1364.0		Increase in gravels				
90	SPT	HA-2-90-91.5	4	50/4"	90.0	SM	Rock flour		6.1	24.7	
					1363.0		Gravel lens - 4-in. thick				
					91.0	SC	Dark brown, clayey SAND, moist, dense, mostly fine to medium sand, plastic fines, few coarse sand, micas				
					1361.0						
					93.0	SM	Yellowish brown, silty SAND with gravel, moist, dense, mostly fine to medium sand, little fines and coarse sand, little gravels, subangular to angular, gravel lens				1360
95	SPT	HA-2-95-96.5	2	50/2"		SM	Gravel 18%, sand 56%, fines 26%		3.3	26.0	
							Rock flour				
							Coarsens down sequence				
							Rock flour and gravels				1355
100	SPT	HA-2-100-101.5	3	50/3"		SM	Dark yellowish brown, silty SAND with gravel, moist, dense, mostly fine to coarse sand, little fine to coarse gravels, mica		4.1	25.7	
							Fines down sequence, less gravels				
						SM	Gradational contact Yellowish brown, silty SAND, moist, dense, mostly fine to medium sand, little non plastic fines, few coarse sand, few fine gravel, micas				1350
105	SPT	HA-2-105-106.5	4	50/4"		SM	Rock flour and lens of gravel ~4-in. thick Dark yellowish brown, silty SAND, moist, mostly fine to medium sand, non plastic fines, few coarse sand and gravel, micas, gravel 12%, sand 58%, fines 40%		4.3	40.0	
							Coarsens down sequence				
					1346.0						
					108.0	SP	Brownish yellow, poorly graded SAND with gravel, moist, mostly fine to medium sand, some coarse sand, little fine gravel, trace coarse gravel				1345
					1344.0		Basal cobble lens, rock flour				
110	SPT	HA-2-110-111.5	4	50/4"	110.0	SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, few fine to coarse gravel, non plastic fines		4.0	17.7	
							Rock flour				1340
115	SPT	HA-2-115-116.5	3	50/3"		SM	Yellowish brown, silty SAND, moist, medium dense, non plastic fines, some fine to medium sand, gravel 5%, sand 63%, fines 32%		3.0	32.0	
						SM	Brown, silty SAND, moist, dense, mostly fine to medium sand, few coarse sand				
						SM	Coarsens with depth, trace non plastic fines Strong brown, silty SAND with gravel, mostly fine to medium sand, some coarse sand, few fine gravel, non plastic fines				1335

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-05 (HA-2)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-05 (HA-2)
File No. 0132051-005
Sheet No. 4 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
120	SPT	HA-2-120-121.5	5	50/5"		SM	Rock flour Brown, silty SAND with gravel, mostly fine to medium SAND, some coarse sand to fine gravel, non plastic fines		4.3	26.5	
							Rock flour				
							Fines down sequence, non plastic fines				1330
125	SPT	HA-2-125-126.5	3	50/3"		SM	Strong brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, fine gravel, non plastic fines, gravel 15%, sand 57%, fines 28%		5.1	28.0	
							Rock flour				1325
130	SPT	HA-2-130-131.5	5	50/5"		SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, few fine to coarse gravel, non plastic fines, micas		5.0	16.3	
							Rock flour Fines down sequence				
						SM	Brown, silty SAND, moist, medium dense, mostly fine sand, some medium sand, some non plastic fines				1320
135	SPT	HA-2-135-136.5	4	50/4"		SM	Brown, silty SAND, moist, medium dense, mostly fine to medium sand, some coarse sand, non plastic fines, micas, gravel 1%, sand 53%, fines 46%		11.4	46.0	
							Color change to light brown, coarsens down sequence Rock flour				1315
140	SPT	HA-2-140-141.5	5	50/5"		SM	Brown, silty SAND, moist, mostly fine to medium sand, non plastic fines, micas		6.6	25.4	
							Fines down sequence				
						SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, little fine to coarse gravel, trace cobble, non plastic fines, micas				1310
							Rock flour				
145	SPT	HA-2-145-146.5	4	50/4"			Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, fine gravel, non plastic fines, micas, gravel 13%, sand 69%, fines 18%		4.1	18.0	
							Coarsens down sequence				1305
150					1303.5 150.5	SP	Light yellowish brown, poorly graded SAND with gravel, mostly medium to coarse sand, little fine gravel, little fine sand, few coarse gravel Rig chatter				
							Rock flour				1300
155	SPT	HA-2-155-156.5	2	50/2"	1299.0 155.0	SM	Brown, silty SAND, moist, medium dense, mostly fine sand, some medium sand, few coarse sand, non plastic fines, micas		9.4	30.6	
							Coarsens down sequence				
							Moisture increases, vadose zone				1295
160							Coarsens down sequence, moisture increasing				
					1293.0 161.0						
					1292.0 162.0	SP-SM	Light brown, poorly graded SAND with silt, moist, medium dense, mostly fine to coarse sand, some fine sand, few fine gravel, micas				
						SP	Light yellowish brown, poorly graded SAND with gravel, wet, mostly medium to				1290

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-05 (HA-2)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-05 (HA-2)
File No. 0132051-005
Sheet No. 5 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
165					1289.0		coarse sand, little fine sand, little fine gravel, micas				
	SPT	HA-2-165-166.5	3	50/3"	165.0 1287.5	SC	Dark brown, clayey SAND, wet, dense, mostly fine to medium sand, some plastic fines, few coarse sand, micas, gravel 1%, sand 67%, fines 32%		10.0	32.0	
					166.5	SP	Brown, poorly graded gravelly SAND, wet, mostly medium to coarse sand, little fine gravel, few fine sand, non plastic fines, micas				1285
170					1284.0 170.0	SM	Brown, silty SAND, wet, medium dense, mostly fine to medium sand, few coarse sand, few non plastic fines, micas				
						SM	Brown, silty SAND with gravel, wet, mostly medium to coarse sand, few fine sand, gravel and non plastic fines, mica				1280
175	SPT	HA-2-175-176.5	3	50/3"	1278.7 175.3		BOTTOM OF EXPLORATION 175.3 FT GROUNDWATER ENCOUNTERED AT 163.0 FT		11.0	18.1	
											1275
180											
											1270
185											
											1265
190											
											1260
195											
											1255
200											
											1250
205											

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-05 (HA-2)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-06 (HA-1)

Project	Cajon Creek Quarry Phase II Expansion, San Bernardino, California
Client	Vulcan Materials Company
Contractor	Yellow Jacket Drilling Services, LLC

File No.	0132051-005
Sheet No.	1 of 5
Start	29 June 2021
Finish	1 July 2021
Driller	Carlos
H&A Rep.	J. Vanderwal
Elevation	1497.0
Datum	NAVD88
Location	See Plan

		Drilling Equipment and Procedures
Boring Diameter (in.)	6.0	Rig Make & Model: Terra Sonic TSi 150T
Hammer Type	Automatic Hammer	Bit Type: Sonic Bit
Hammer Weight (lb)	140	Drill Mud: None
Hammer Fall (in.)	30	Casing: Sonic (4-in. ID)
		Hoist/Hammer: Sonic Bit/Automatic Hammer
		PID Make & Model:

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
0						SM	Light brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel, few non plastic fines, trace coarse gravel, micas				1495
							Rock flour				
5						SM	Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand to fine gravel, few coarse gravel, trace non plastic fines, micas				1490
							Coarsens down sequence				
10						SM	Dark brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel, few non plastic fines, micas				1485
						SM	Gray brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few non plastic fines, micas				
15					1482.0 / 15.0	SP	Light brown, poorly graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, little coarse gravel				1480
							Rig chatter				
					1479.0 / 18.0	SM	Brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, little non plastic fines, micas				
20						SM	Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse and fine gravel, trace coarse gravel, trace non plastic fines, micas				1475
					1475.0 / 22.0	SP	Light brown, poorly graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, few coarse gravel, trace non plastic fines, micas				
25							Rig chatter				
							Rock flour				
					1470.0 / 27.0	SM	Yellow brown, silty SAND with gravel, moist, mostly fine to medium sand, little coarse sand, few fine gravel, few non plastic fines, micas				1470
30											

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
6/30/2021	18:30	-	150	150	143
7/1/2021	07:30	-	150	150	143.5

Sampler Type Legend

SPT - Standard Penetration Test
MCS - Modified California Sampler (2.43-in ID)

Summary

Overburden (ft)	175
Rock Cored (ft)	
Samples	16

Boring No. SB-21-06 (HA-1)

Field Tests: **Dilatancy** : R - Rapid S - Slow N - None **Plasticity** : N - Nonplastic L - Low M - Medium H - High
Toughness : L - Low M - Medium H - High **Dry Strength** : N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-06 (HA-1)
File No. 0132051-005
Sheet No. 2 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
30						SM	Coarsens down sequence				
							Trace gravel up to 2 in.				1465
						SM	Gray brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand and fine gravel, trace coarse gravel, little non plastic fines, micas				
35					1459.5 37.5						1460
					1458.5 38.5	SW	Yellow brown, well graded SAND, moist, mostly fine to medium sand, few coarse sand, mica				
						SP	Brown, poorly graded SAND with gravel, moist, mostly fine to medium sand, some coarse sand and fine gravel, trace coarse gravel, trace non plastic fines, micas				
40					1456.0 41.0		Gravel up to 2 in.				
						SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, little coarse sand, few fine gravel, trace coarse gravel, trace non plastic fines, micas				1455
							Rig chatter				
					1452.5 44.5		Rock flour				
45						SP	Yellowish brown, poorly graded SAND with gravel, mostly fine to coarse sand, little fine gravel, trace coarse gravel, trace non plastic fines				
							Rig chatter				1450
							Gravel up to 3 in.				
50											
							Coarsens down sequence				1445
55						SP	Yellowish brown, poorly graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, few coarse gravel, trace non plastic fines, micas				
					1440.5 56.5	SM	Brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel and non plastic fines, micas				1440
60											
						SM	Gray brown, silty SAND with gravel, moist, mostly fine to coarse sand, little fine to coarse gravel, trace non plastic fines, gravel up to 2 in., micas				1435
					1434.5 62.5	SW	Rig chatter				
					1433.5 63.5	SM	Yellowish brown, well graded SAND, moist, mostly fine to medium sand, little coarse sand, micas				
65							Brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel, little plastic fines, micas				1430
							Coarsens down sequence				
70											
							Iron oxide staining				1425
						SM	Gray brown, silty SAND, moist, mostly fine to medium sand, some coarse sand and fine gravel, few coarse gravel, few non plastic fines, micas				

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-06 (HA-1)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-06 (HA-1)
File No. 0132051-005
Sheet No. 3 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
75					1421.0 76.0	SP	Yellowish-brown, poorly graded SAND, moist, mostly fine to medium sand, micas				1420
					1419.5 77.5	SP-SM	Light brown, poorly graded SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel, trace coarse gravel, few non plastic fines, mica				
80					1417.5 79.5 1417.0	CL	2-in. thick CLAY lens				
					80.0	SM	Dark brown, silty SAND, moist, mostly very fine to medium sand, little coarse sand, few fine gravel, few non plastic fines, micas Coarsens down sequence				1415
85					1411.0 86.0	SP	Gray brown, poorly graded SAND with gravel, moist, mostly fine to medium sand, little coarse sand, little fine gravel, micas				1410
					1408.0 89.0	SM	Light brown, silty SAND with gravel, moist, micas, gravel 19%, sand 66%, fines 15%				
90	SPT	HA-1-90-91.5	4	50/4"					4.5	15.0	1405
							Trace coarse gravel up to 2 in. Coarsens down sequence				
95	SPT	HA-1-95-96.5	5	50/5"		SM	Brown, silty SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, non plastic fines, trace coarse gravel up to 2 in., micas		3.6	19.1	1400
							Rig chatter				
						SM	Brown, silty SAND, moist, mostly fine to medium sand, some coarse sand, few fine gravel. few non plastic fines, micas				
100	SPT	HA-1-100-101.5	4	50/4"			Rock flour				
						SM	Brown, silty SAND, moist, fine to coarse sand, fine gravel, non plastic fines, micas, gravel 13%, sand 55%, fines 32%		4.3	32.0	1395
							Rig chatter Coarsens down sequence				
105					1391.5 105.5	SW	Gray brown, well graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, few non plastic fines, few coarse gravel, micas				1390
							Trace coarse gravel up to 2 in.				
110	SPT	HA-1-110-111.5	5	50/5"	1387.0 110.0	SW-SM	Brown, well graded SAND with silt, moist, moistly fine to medium sand, some coarse sand, few fine gravel, non plastic fines, micas		2.8	10.4	
					1384.5 112.5	SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, little fine gravel, few non plastic fines, micas				1385
115						SM	Gray brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, little non plastic fines, micas				
					1381.0 116.0	SP	Poorly graded SAND with gravel, moist, mostly fine to medium sand, some coarse sand, few fine gravel, trace non plastic fines, micas Trace coarse gravel up to 2 in.				1380

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-06 (HA-1)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-06 (HA-1)
File No. 0132051-005
Sheet No. 4 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
120					1377.0						
	SPT	HA-1-120-121.5	4	50/4"	120.0	SM	Dark brown, silty SAND, moist, mostly fine to coarse sand, few non plastic fines, fine gravel, micas, gravel 15%, sand 67%, fines 18% Rig chatter Trace coarse gravel up to 2 in., rock flour		3.9	18.0	
							Fine gravel, increases down sequence				1375
125						SM	Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, few fine gravel, few non plastic fines, micas				
											1370
130	SPT	HA-1-130-131.5	4	50/4"		SM	Fines 16%		7.0	16.3	
						SM	Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, little fine to coarse gravel, trace non plastic fines, micas				1365
135							2-in. non plastic fines lens				
					1360.5						
					136.5	SP	Poorly graded SAND, moist, mostly fine to medium sand, little coarse sand, trace non plastic fines, micas				1360
					1359.0						
					138.0	SW	Well graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, trace non plastic fines, micas				
					1357.0						
140	SPT	HA-1-140-141.5	4	50/4"	140.0	SM	Yellowish brown, silty SAND, moist to wet, mostly fine to coarse sand, non plastic fines, fine gravel, micas, gravel 11%, sand 65%, fines 24%		3.6	24.0	
							Groundwater at 143 ft				1355
					1352.5						
145					144.5	ML	Gray brown, sandy SILT, wet, mostly non plastic fines, some fine sand, few medium to coarse sand, micas				
					1351.0						
					146.0	SP	Dark brown, poorly graded SAND, wet, mostly medium to coarse sand, little fine sand, few fine gravel, micas				1350
					1347.0						
150	SPT	HA-1-150-151.5	12	37 50/6"	150.0	SP-SM	Gray brown, poorly graded SAND with silt, wet, medium dense, mostly fine to medium sand, some coarse sand, non plastic fines, micas		10.6	11.2	
							Trace coarse gravel up to 2 in. Dark brown				1345
					1343.0						
					154.0	SM	Gray brown, silty SAND, wet, medium dense, mostly fine to medium sand, some coarse sand, few fine gravel, little non plastic fines				
155						SM	Trace coarse gravel up to 2 in. Dark brown, silty SAND, wet, mostly fine to coarse sand, little fine to coarse gravel, little non plastic fines				1340
					1337.0						
160	SPT	HA-1-160-161.5	16	6 5 50/4"	160.0	SP-SM	Dark brown, poorly graded SAND with silt, wet, mostly fine to medium sand, few coarse sand, non plastic fines, trace fine gravel		11.4	7.4	
						SP-SM	Yellowish brown, poorly graded SAND with silt, wet, mostly fine to coarse sand, few fine gravel, few non plastic fines, trace cobbles				1335
					1333.5						
					163.5						

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-06 (HA-1)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

GEOTECHNICAL TEST BORING REPORT

Boring No. SB-21-06 (HA-1)
File No. 0132051-005
Sheet No. 5 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
165					1331.0	SM	Brown, silty SAND, wet, mostly fine to medium sand, little coarse sand, little non plastic fines, trace fine gravel				
					166.0	SP-SM	Dark brown, poorly graded SAND with silt, wet, mostly fine to medium sand, little coarse sand, few fine to coarse gravel, few non plastic fines, micas Rig chatter Trace coarse gravel up to 2 in.				1330
170	SPT	HA-1-170-171.5	18	3 2 10	1326.0				17.0	13.0	
					171.0	SM	Brown, silty SAND, wet, mostly fine to medium sand, few coarse sand, non plastic fines, fine gravel, micas, gravel 2%, sand 85%, fines 13% Rig chatter, hard drilling				1325
175					1321.5	SM	Yellowish brown, silty SAND, wet, mostly fine to medium sand, some coarse sand, few non plastic fines, trace fine gravel				
					175.5	SP-SM	Poorly graded SAND with silt, wet, mostly fine to coarse sand, little fine gravel, trace coarse gravel, trace non plastic fines, micas				1320
180	SPT	HA-1-180-181.5	3	50/3"	1316.7 180.3		BOTTOM OF EXPLORATION 180.3 FT GROUNDWATER ENCOUNTERED AT 143.0 FT				1315
185											1310
190											1305
195											1300
200											1295
205											1290

Note: Material descriptions based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. SB-21-06 (HA-1)

H&A BORING MDH SAMPLE - VULCAN 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB -CLIENT ONLY VERSION.GPJ 22 Sep 22

APPENDIX C
Laboratory Test Results

LARGE SCALE DIRECT SHEAR REPORT

Internal Shear D-3080 Modified

Geo-Logic ASSOCIATES

Report Date: May 3, 2018

Client / Project Name: HALEY & ALDRICH, INC. / VMC SAN BERNARDINO AREA Q, 132051-002

Project No: AU18.1138.00

Superstrate: ⇦ Spacers

Material 1: ⇦ 132051 Sample 1, Sand w/ Gravel LSN: 4353A Remolded

Material 2: ⇨ 132051 Sample 1, Sand w/ Gravel LSN: 4353A Remolded

Substrate: ⇨ Spacers

PEAK STRENGTH

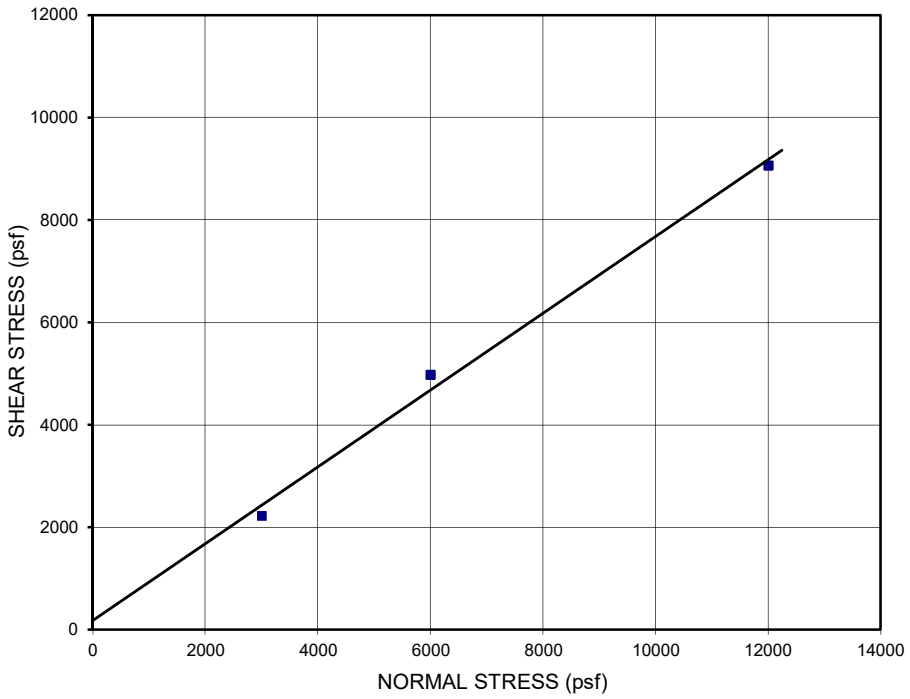
Test Point	Normal Stress psi	Normal Stress psf	Shear Stress psf	Secant Friction Angle
1.	20.8	3000	2230	37
2.	41.7	6000	4980	40
3.	83.3	12000	9070	37

Adhesion: 180 psf

Friction Angle: 37 degrees

Coefficient of Friction: 0.75

NOTE: GRAPH NOT TO SCALE



STRENGTH ENVELOPE

(at 3.0 in. displacement)

Test Point	Normal Stress psi	Normal Stress psf	Shear Stress psf	Secant Friction Angle
1.	20.8	3000	1700	30
2.	41.7	6000	4400	36
3.	83.3	12000	8540	35

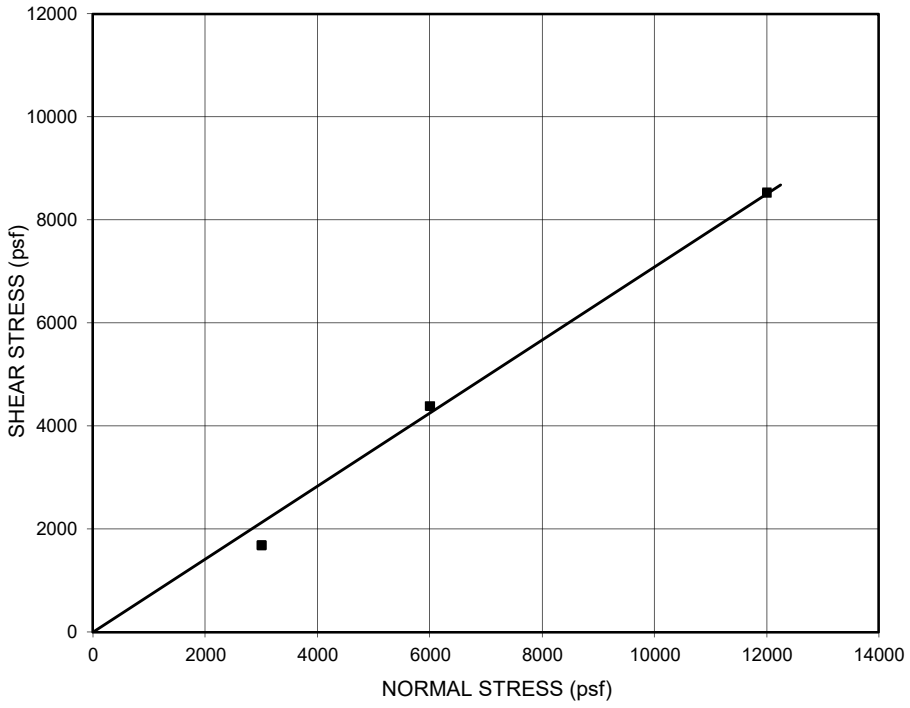
Adhesion: 0 psf

Friction Angle: 35 degrees

Coefficient of Friction: 0.71

Note: Intercept set to zero

NOTE: GRAPH NOT TO SCALE



This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

LARGE SCALE DIRECT SHEAR REPORT

Internal Shear D-3080 Modified

Geo-Logic ASSOCIATES

Report Date: May 3, 2018

Client / Project Name: HALEY & ALDRICH, INC. / VMC SAN BERNARDINO AREA Q, 132051-002

Project No: AU18.1138.00

Superstrate: ⇦ Spacers

Material 1: ⇦ 132051 Sample 1, Sand w/ Gravel LSN: 4353A Remolded

Material 2: ⇨ 132051 Sample 1, Sand w/ Gravel LSN: 4353A Remolded

Substrate: ⇨ Spacers

DISPLACEMENT vs. SHEAR STRESS

Test Point	Normal Stress	
	psi	psf
1.	20.8	3000
2.	41.7	6000
3.	83.3	12000

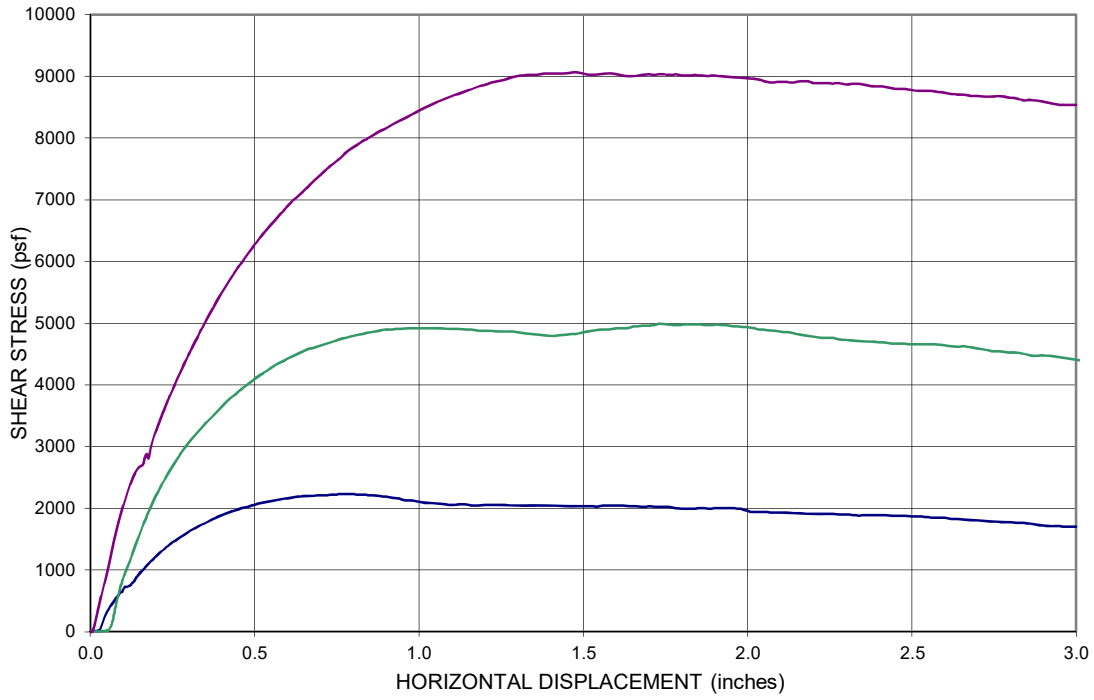
MOISTURE DATA:

(Gravel)

Initial Water Content: 5%

Initial Dry Density: 113.8 pcf

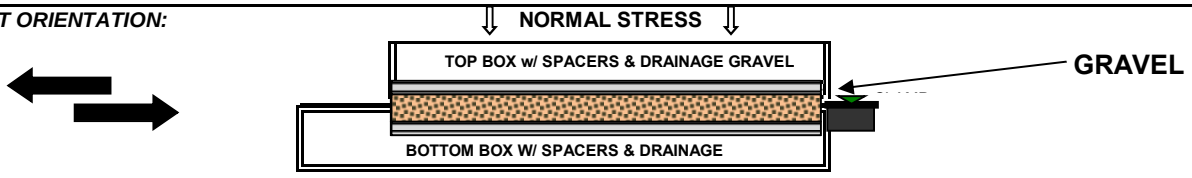
Final Water Content:(%)
1) 15.1 2) 13.9 3) 12.3



STANDARD CONDITIONS: ***SHEAR DISPLACEMENT RATE: 0.04 in/min***

1. The "gap" between shear boxes was set at 0.5 inches.
2. The test specimens were flooded during testing unless otherwise noted.
3. High Normal Stresses, >5psi (35 kPa) was applied using air pressure.
4. Low Normal Stresses, <5psi (35 kPa) was applied using dead weights.
5. The tests were terminated after 3.0"(75 mm) of displacement unless otherwise noted.
6. Tests were performed in general accordance with ASTM procedure D-3080 - Modified using a Brainard-Killman LG-112 direct shear machine with an effective area of 12" x 12" (300 x300 mm).

TEST ORIENTATION:



SPECIAL TEST NOTES:

1. The test method was modified to measure the internal shear characteristics of the gravel.
2. The gravel was remolded into both the upper and lower box.
3. Each test point was consolidated under specified normal stress for approximately 1 hour, then sheared.
4. The test was performed in a "wet" or "flooded" condition.
5. Shearing occurred internally within the gravel.
6. The Peak Friction Angle and Adhesion (or Cohesion) results given here are based on a mathematically determined best fit line.
7. The Residual Friction Angle and Adhesion (or Cohesion) results given here are based on an intercept through zero.
8. Further interpretation should be conducted by a qualified professional experienced in geosynthetic and geotechnical engineering.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

LARGE SCALE DIRECT SHEAR REPORT

Internal Shear D-3080 Modified

Geo-Logic ASSOCIATES

Report Date: May 3, 2018

Client / Project Name: HALEY & ALDRICH, INC. / VMC SAN BERNARDINO AREA Q, 132051-002

Project No: AU18.1138.00

Superstrate: ⇦ Spacers

Material 1: ⇦ 132051 Sample 3, Gravelly Sand LSN: 4353B Remolded

Material 2: ⇨ 132051 Sample 3, Gravelly Sand LSN: 4353B Remolded

Substrate: ⇨ Spacers

PEAK STRENGTH

Test Point	Normal Stress psi	Normal Stress psf	Shear Stress psf	Secant Friction Angle
1.	20.8	3000	2150	36
2.	41.7	6000	4880	39
3.	83.3	12000	10650	42

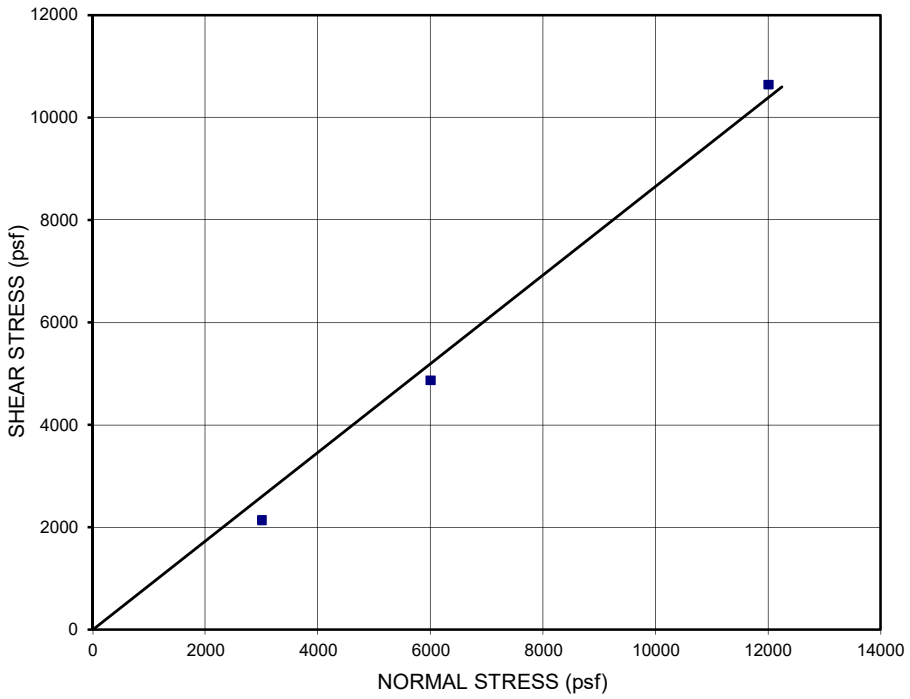
Adhesion: 0 psf

Friction Angle: 41 degrees

Coefficient of Friction: 0.87

Note: Intercept set to zero

NOTE: GRAPH NOT TO SCALE



STRENGTH ENVELOPE

(at 3.0 in. displacement)

Test Point	Normal Stress psi	Normal Stress psf	Shear Stress psf	Secant Friction Angle
1.	20.8	3000	2080	35
2.	41.7	6000	4450	37
3.	83.3	12000	10520	41

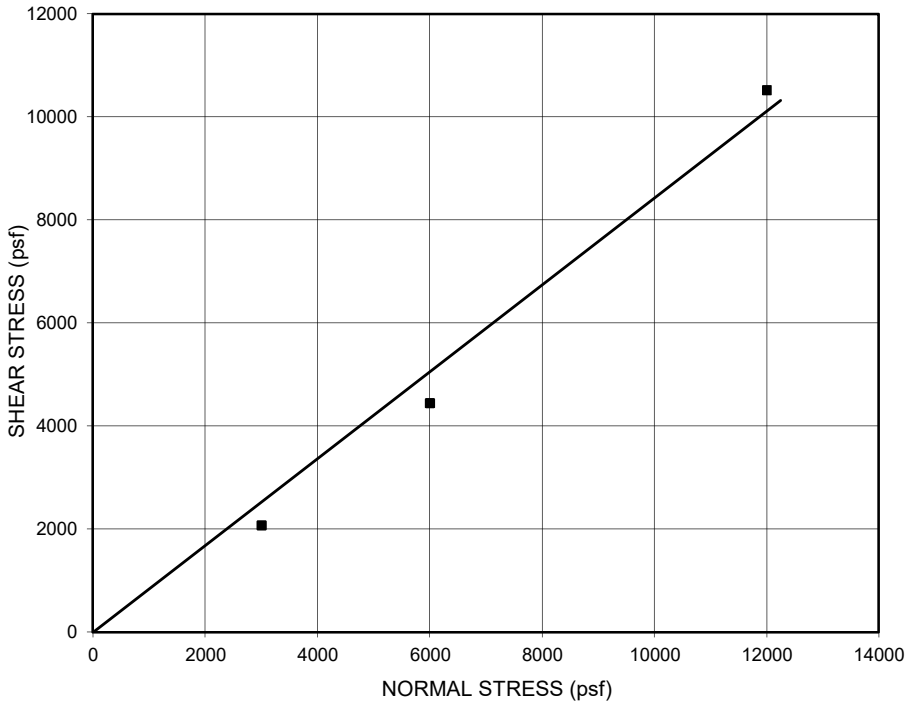
Adhesion: 0 psf

Friction Angle: 40 degrees

Coefficient of Friction: 0.84

Note: Intercept set to zero

NOTE: GRAPH NOT TO SCALE



This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

LARGE SCALE DIRECT SHEAR REPORT

Internal Shear D-3080 Modified

Geo-Logic ASSOCIATES

Report Date: May 3, 2018

Client / Project Name: HALEY & ALDRICH, INC. / VMC SAN BERNARDINO AREA Q, 132051-002

Project No: AU18.1138.00

Superstrate: ⇦ Spacers

Material 1: ⇦ 132051 Sample 3, Gravelly Sand LSN: 4353B Remolded

Material 2: ⇨ 132051 Sample 3, Gravelly Sand LSN: 4353B Remolded

Substrate: ⇨ Spacers

DISPLACEMENT vs. SHEAR STRESS

Test Point	Normal Stress	
	psi	psf
1.	20.8	3000
2.	41.7	6000
3.	83.3	12000

MOISTURE DATA:

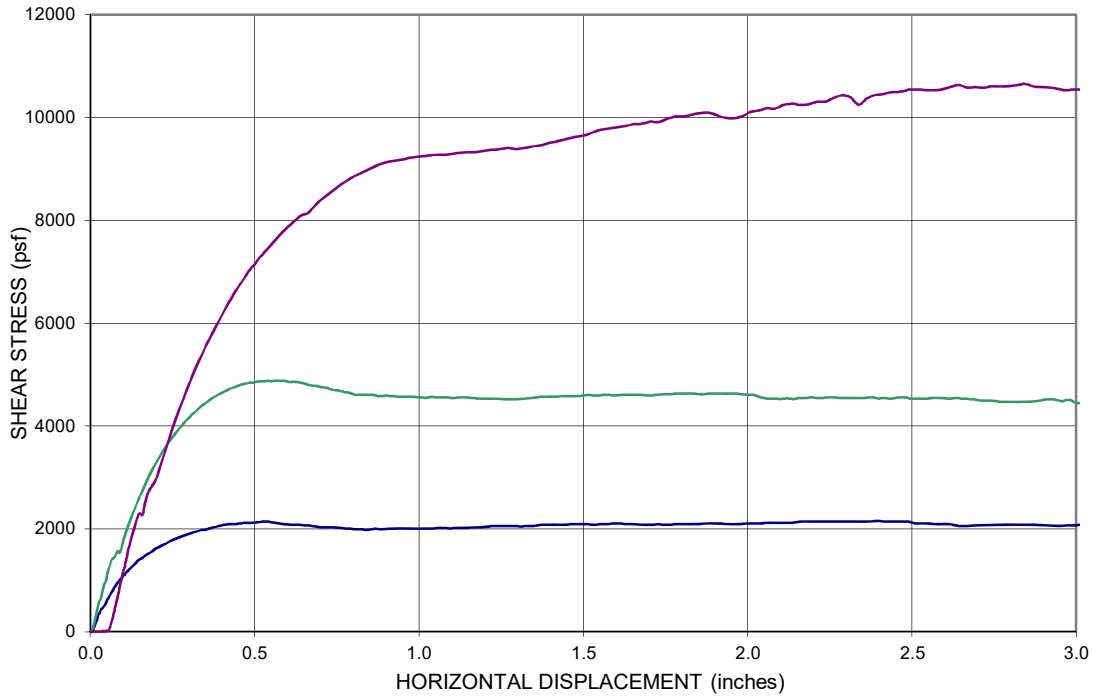
(Gravel)

Initial Water Content: 5%

Initial Dry Density: 119.7 pcf

Final Water Content:(%)

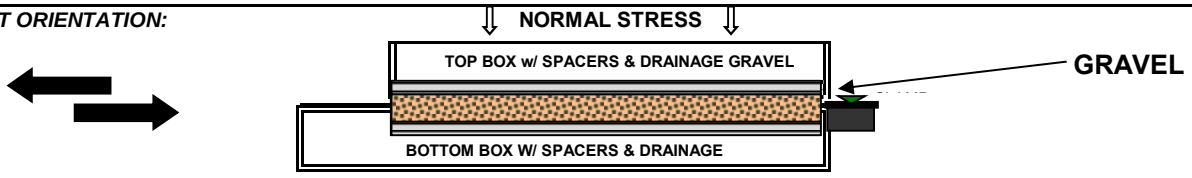
1) 9.6 2) 12.9 3) 11.4



STANDARD CONDITIONS: ***SHEAR DISPLACEMENT RATE: 0.04 in/min***

1. The "gap" between shear boxes was set at 0.5 inches.
2. The test specimens were flooded during testing unless otherwise noted.
3. High Normal Stresses, >5psi (35 kPa) was applied using air pressure.
4. Low Normal Stresses, <5psi (35 kPa) was applied using dead weights.
5. The tests were terminated after 3.0"(75 mm) of displacement unless otherwise noted.
6. Tests were performed in general accordance with ASTM procedure D-3080 - Modified using a Brainard-Killman LG-112 direct shear machine with an effective area of 12" x 12" (300 x300 mm).

TEST ORIENTATION:



SPECIAL TEST NOTES:

1. The test method was modified to measure the internal shear characteristics of the gravel.
2. The gravel was remolded into both the upper and lower box.
3. Each test point was consolidated under specified normal stress for approximately 1 hour, then sheared.
4. The test was performed in a "wet" or "flooded" condition.
5. Shearing occurred internally within the gravel.
6. The Friction Angle and Adhesion (or Cohesion) results given here are based on an intercept through zero.
7. Further interpretation should be conducted by a qualified professional experienced in geosynthetic and geotechnical engineering.

This testing is based upon accepted industry practice as well as the test method listed. These results apply only to the samples supplied and tested for the above referenced job.

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PERCENT PASSING NO. 200 SIEVE

ASTM D1140

Client:	Haley & Aldrich	AP Lab No.:	21-0722
Project Name:	San Bernardino Phase II	Test Date:	07/19/21
Project Number:	0132051-005		

Boring No.	Sample Type	Depth (ft)	Percent Fines (%)
HA-1	SPT	95-96.5	19.1
HA-1	SPT	110-111.5	10.4
HA-1	SPT	130-131.5	16.3
HA-1	SPT	150-151.5	11.2
HA-1	SPT	160-161.5	7.4

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PERCENT PASSING NO. 200 SIEVE

ASTM D1140

Client:	Haley & Aldrich	AP Lab No.:	21-0722
Project Name:	San Bernardino Phase II	Test Date:	07/19/21
Project Number:	0132051-005		

Boring No.	Sample Type	Depth (ft)	Percent Fines (%)
HA-2	SPT	90-91.5	24.7
HA-2	SPT	100-101.5	25.7
HA-2	SPT	110-111.5	17.7
HA-2	SPT	120-121.5	26.5
HA-2	SPT	130-131.5	16.3
HA-2	SPT	140-141.5	25.4
HA-2	SPT	155-156.5	30.6
HA-2	SPT	175-176.5	18.1

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PERCENT PASSING NO. 200 SIEVE

ASTM D1140

Client:	Haley & Aldrich	AP Lab No.:	21-0722
Project Name:	San Bernardino Phase II	Test Date:	07/19/21
Project Number:	0132051-005		

Boring No.	Sample Type	Depth (ft)	Percent Fines (%)
HA-4	SPT	235-236.5	13.1
HA-4	SPT	245-246.5	36.5
HA-4	SPT	260-261.5	60.1

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MOISTURE AND DENSITY TEST RESULTS

ASTM D2216 and ASTM D7263 (Method B)

Client: Haley & Aldrich
Project Name: San Bernardino Phase II
Project No.: 0132051-005

AP Lab No.: 21-0722
Test Date: 07/19/21

Boring No.	Sample Type	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
HA-1	SPT	90-91.5	4.5	NA
HA-1	SPT	95-96.5	3.6	NA
HA-1	SPT	100-101.5	4.3	NA
HA-1	SPT	110-111.5	2.8	NA
HA-1	SPT	120-121.5	3.9	NA
HA-1	SPT	130-131.5	7.0	NA
HA-1	SPT	140-141.5	3.6	NA
HA-1	SPT	150-151.5	10.6	NA
HA-1	SPT	160-161.5	11.4	NA
HA-1	SPT	170-171.5	17.0	NA

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Project No.: 0132051-005

AP Lab No.: 21-0722
Test Date: 07/19/21

Boring No.	Sample Type	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
HA-2	SPT	85-86.5	9.3	NA
HA-2	SPT	90-91.5	6.1	NA
HA-2	SPT	95-96.5	3.3	NA
HA-2	SPT	100-101.5	4.1	NA
HA-2	SPT	105-106.5	4.3	NA
HA-2	SPT	110-111.5	4.0	NA
HA-2	SPT	115-116.5	3.0	NA
HA-2	SPT	120-121.5	4.3	NA
HA-2	SPT	125-126.5	5.1	NA
HA-2	SPT	130-131.5	5.0	NA
HA-2	SPT	135-136.5	11.4	NA
HA-2	SPT	140-141.5	6.6	NA
HA-2	SPT	145-146.5	4.1	NA
HA-2	SPT	155-156.5	9.4	NA
HA-2	SPT	165-166.5	10.0	NA
HA-2	SPT	175-176.5	11.0	NA

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MOISTURE AND DENSITY TEST RESULTS

ASTM D2216 and ASTM D7263 (Method B)

Client: Haley & Aldrich
Project Name: San Bernardino Phase II
Project No.: 0132051-005

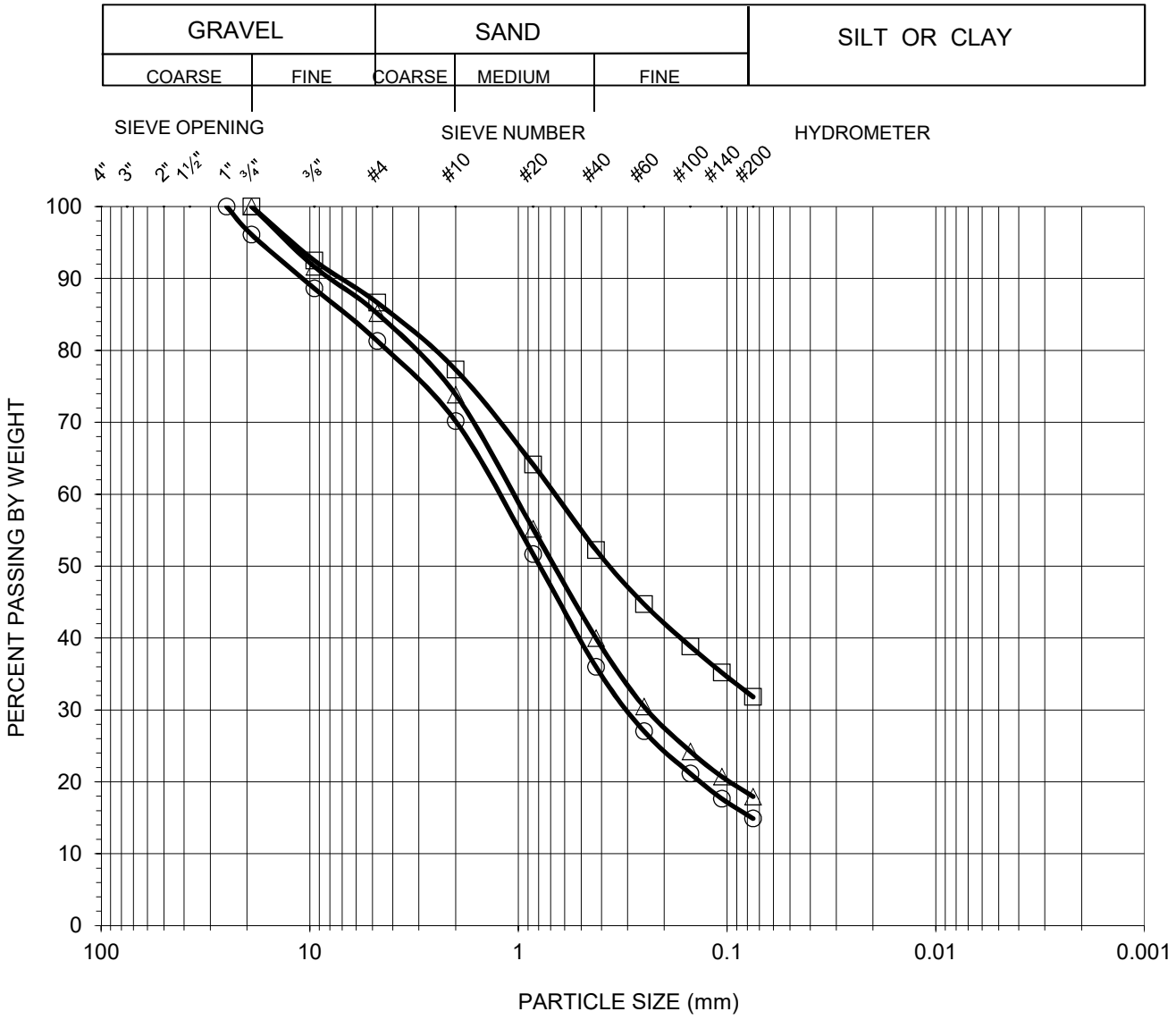
AP Lab No.: 21-0722
Test Date: 07/19/21

Boring No.	Sample Type	Sample Depth (ft.)	Moisture Content (%)	Dry Density (pcf)
HA-4	SPT	230-231.5	3.6	NA
HA-4	SPT	235-236.5	3.6	NA
HA-4	SPT	240-241.5	11.0	NA
HA-4	SPT	245-246.5	8.6	NA
HA-4	SPT	250-251.5	6.1	NA
HA-4	SPT	260-261.5	8.1	NA
HA-4	SPT	270-271.5	8.4	NA

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GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	Haley & Aldrich	Tested by:	SM	Date:	07/21/21
Project Name:	San Bernardino Phase II	Computed by:	NR	Date:	07/22/21
Project No.:	0132051-005	Checked by:	AP	Date:	07/26/21

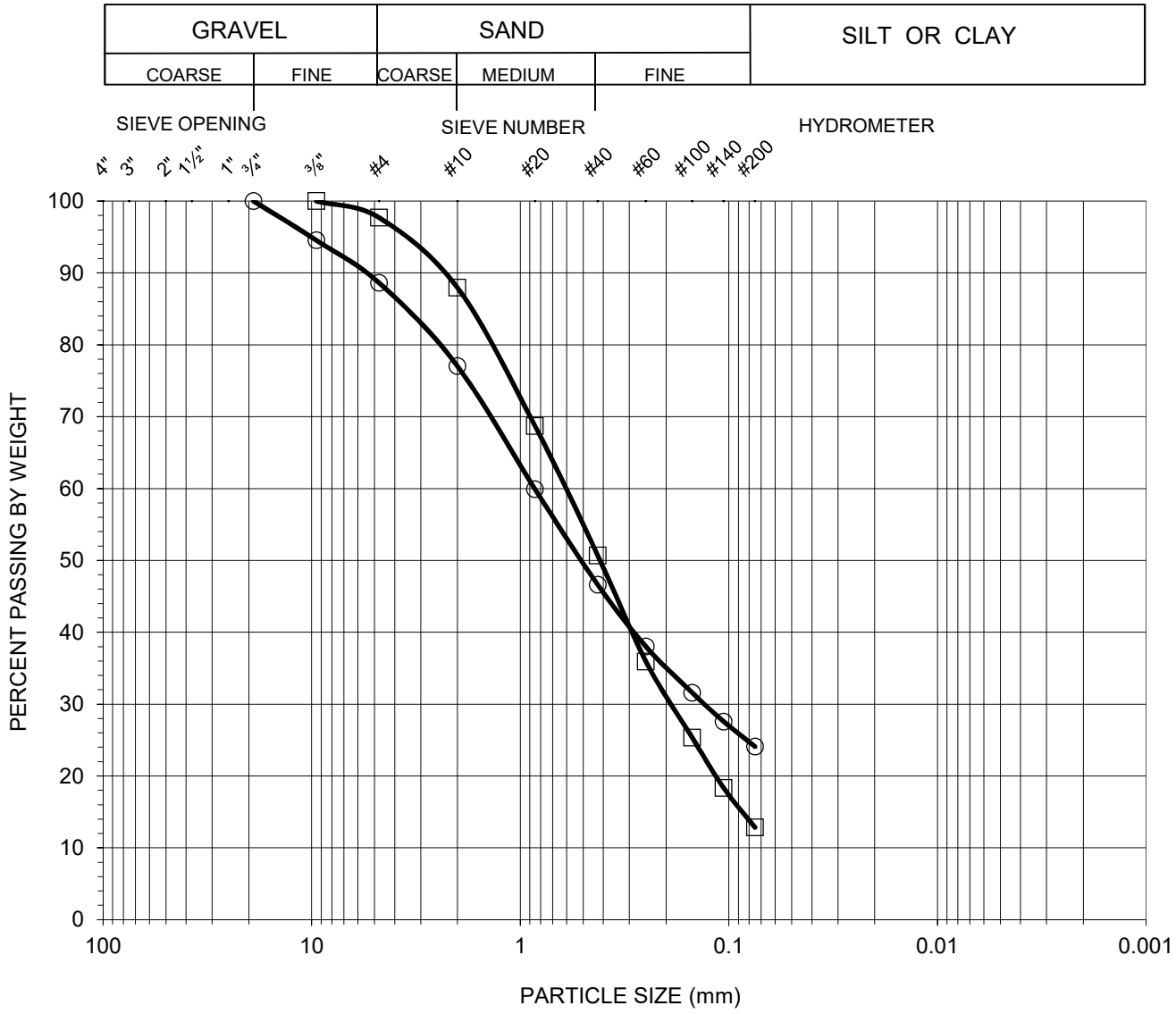


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	HA-1	SPT	90-91.5	19	66	15	N/A	SM
□	HA-1	SPT	100-101.5	13	55	32	N/A	SM
△	HA-1	SPT	120-121.5	15	67	18	N/A	SM

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GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name: Haley & Aldrich — Tested by: SM — Date: 07/21/21
Project Name: San Bernardino Phase II — Computed by: NR — Date: 07/22/21
Project No.: 0132051-005 — Checked by: AP — Date: 07/26/21

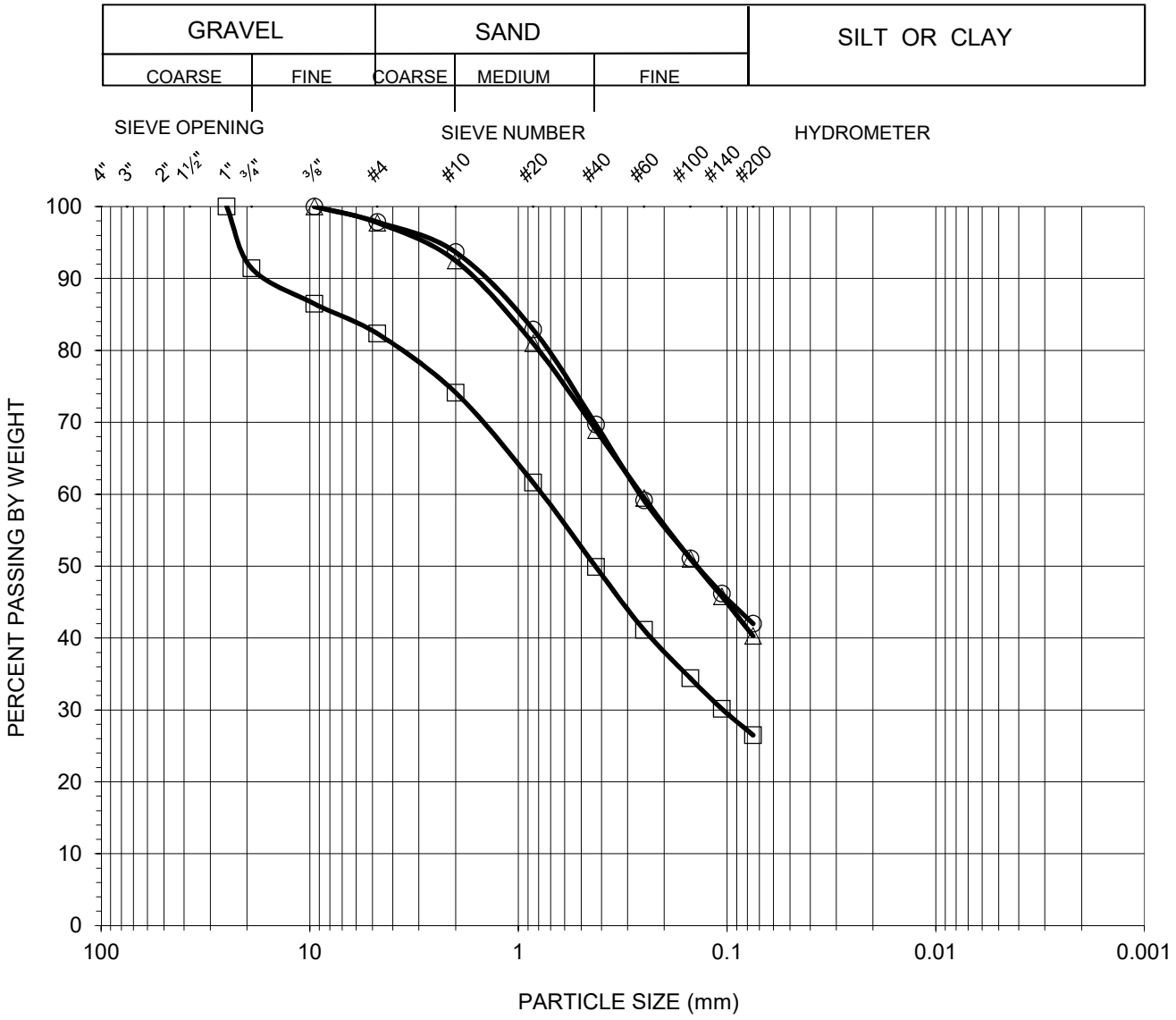


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	HA-1	SPT	140-141.5	11	65	24	N/A	SM
□	HA-1	SPT	170-171.5	2	85	13	N/A	SM

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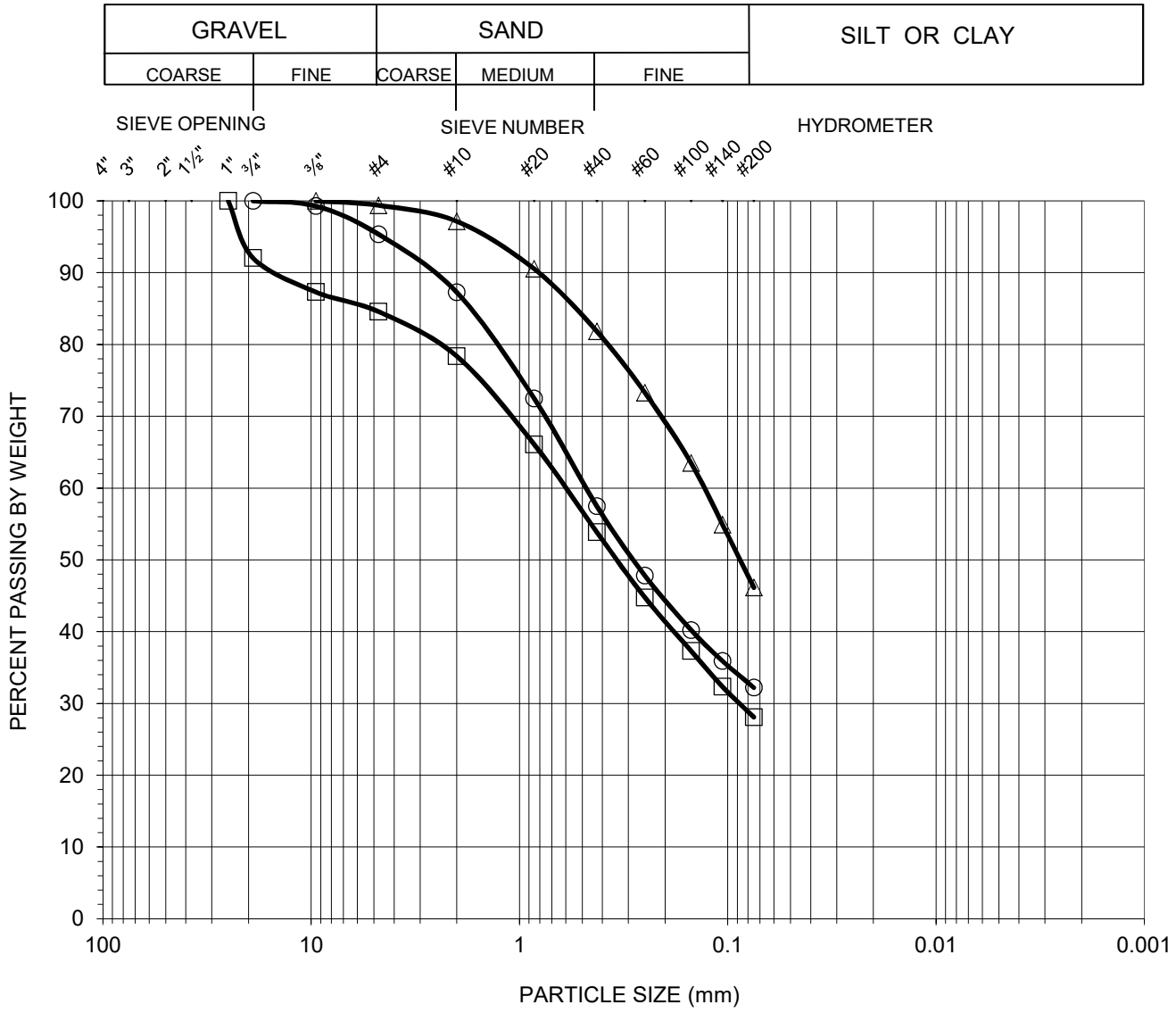
Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	HA-2	SPT	85-86.5	2	56	42	N/A	SC*
□	HA-2	SPT	95-96.5	18	56	26	N/A	SM
△	HA-2	SPT	105-106.5	2	58	40	N/A	SM

**Note: Based on visual classification of sample*

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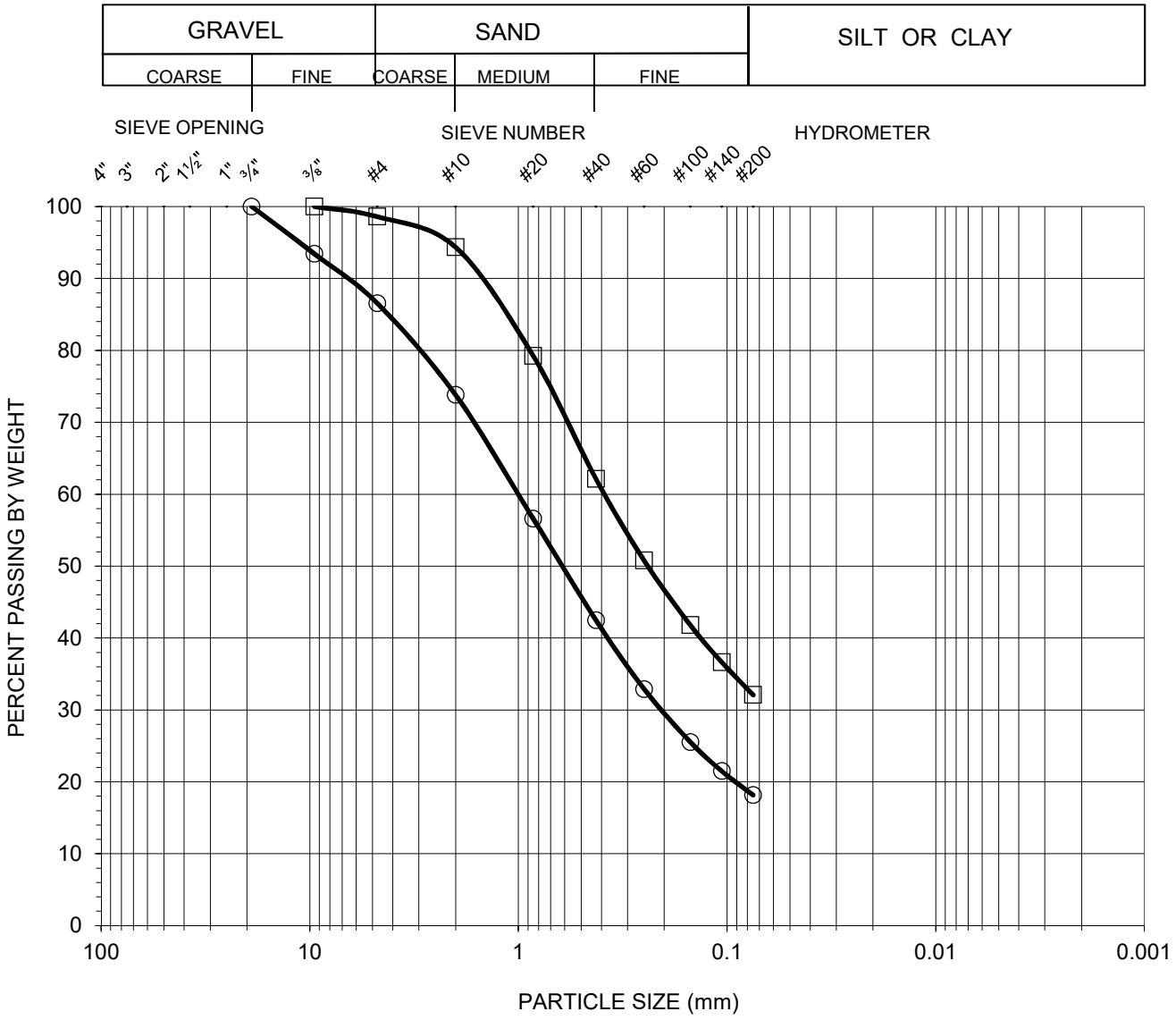


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	HA-2	SPT	115-116.5	5	63	32	N/A	SM
□	HA-2	SPT	125-126.5	15	57	28	N/A	SM
△	HA-2	SPT	135-136.5	1	53	46	N/A	SM

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Project No.: 0132051-005 — Checked by: AP — Date: 07/26/21



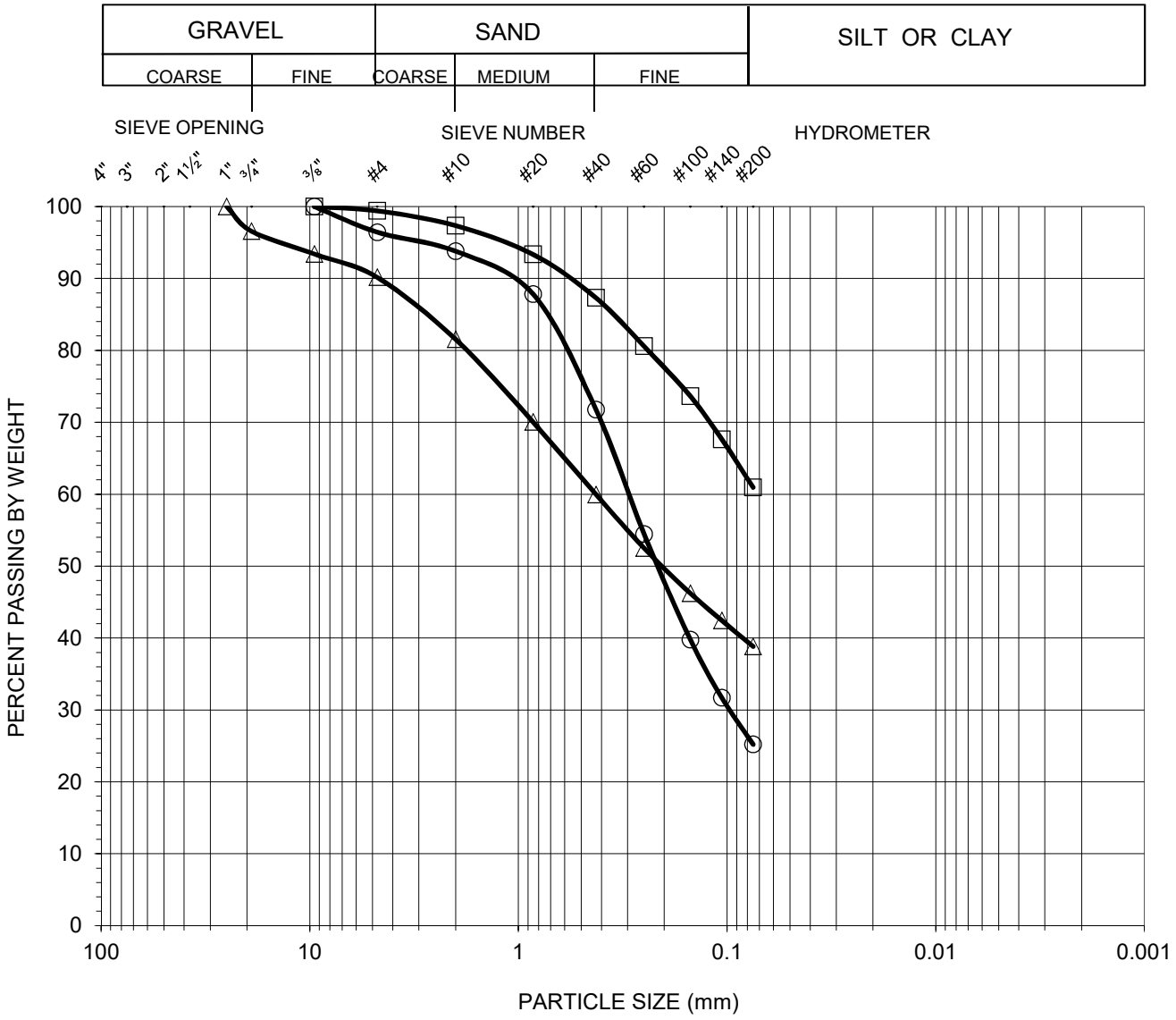
Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	HA-2	SPT	145-146.5	13	69	18	N/A	SM
□	HA-2	SPT	165-166.5	1	67	32	N/A	SC*

**Note: Based on visual classification of sample*

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Project No.:	0132051-005	Checked by:	AP	Date:	07/26/21



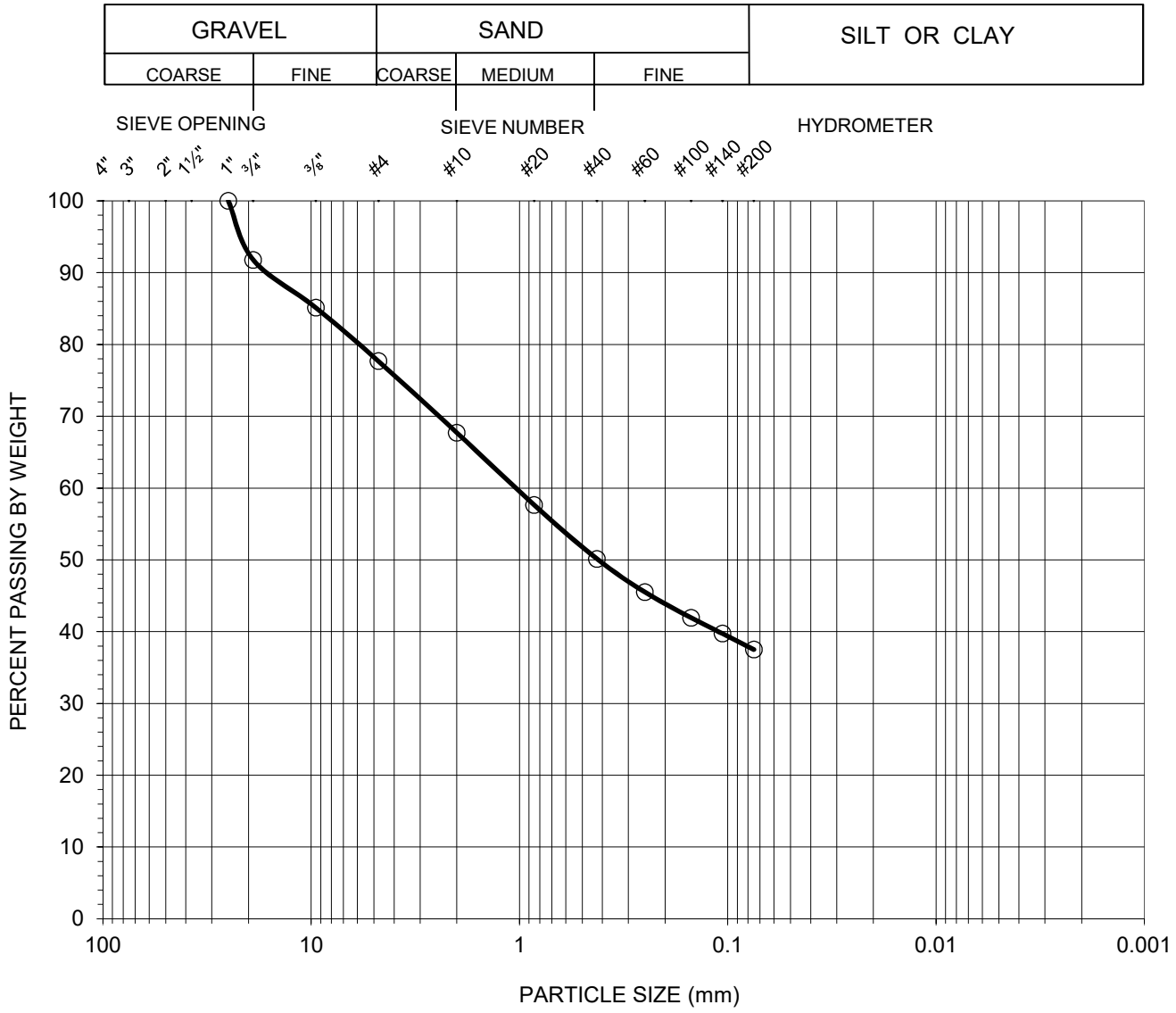
Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	HA-4	SPT	230-231.5	4	71	25	N/A	SM
□	HA-4	SPT	240-241.5	1	38	61	N/A	CL*
△	HA-4	SPT	250-251.5	10	51	39	N/A	SC*

**Note: Based on visual classification of sample*

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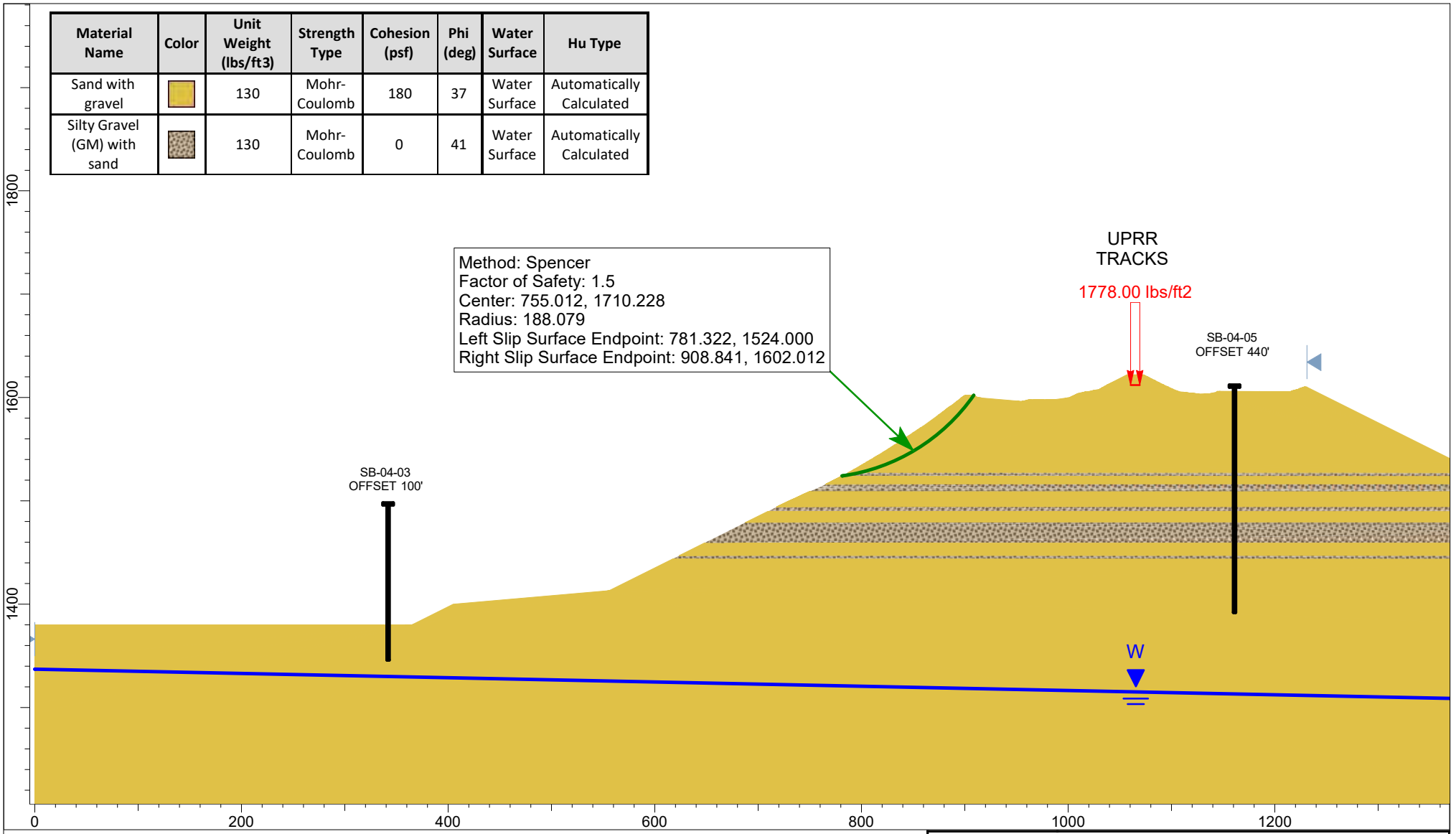


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	HA-4	SPT	270-271.5	22	40	38	N/A	SC*

**Note: Based on visual classification of sample*

APPENDIX D
Slope Stability Analysis

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface	Automatically Calculated
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface	Automatically Calculated



HALEY ALDRICH

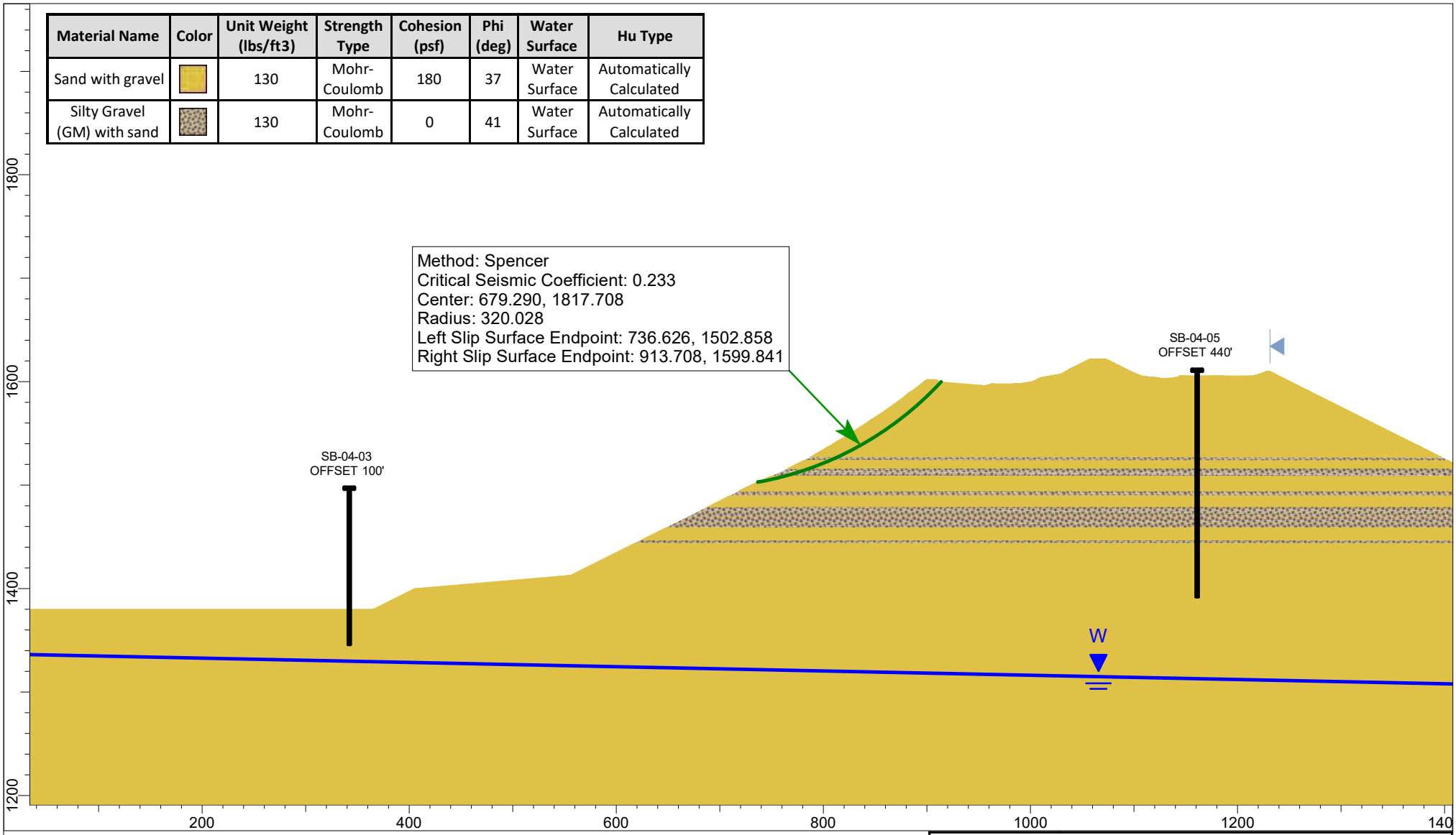
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CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION A-A' (WEST)
STATIC ANALYSIS

MAY 2022

FIGURE D1

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface	Automatically Calculated
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface	Automatically Calculated



HALEY ALDRICH

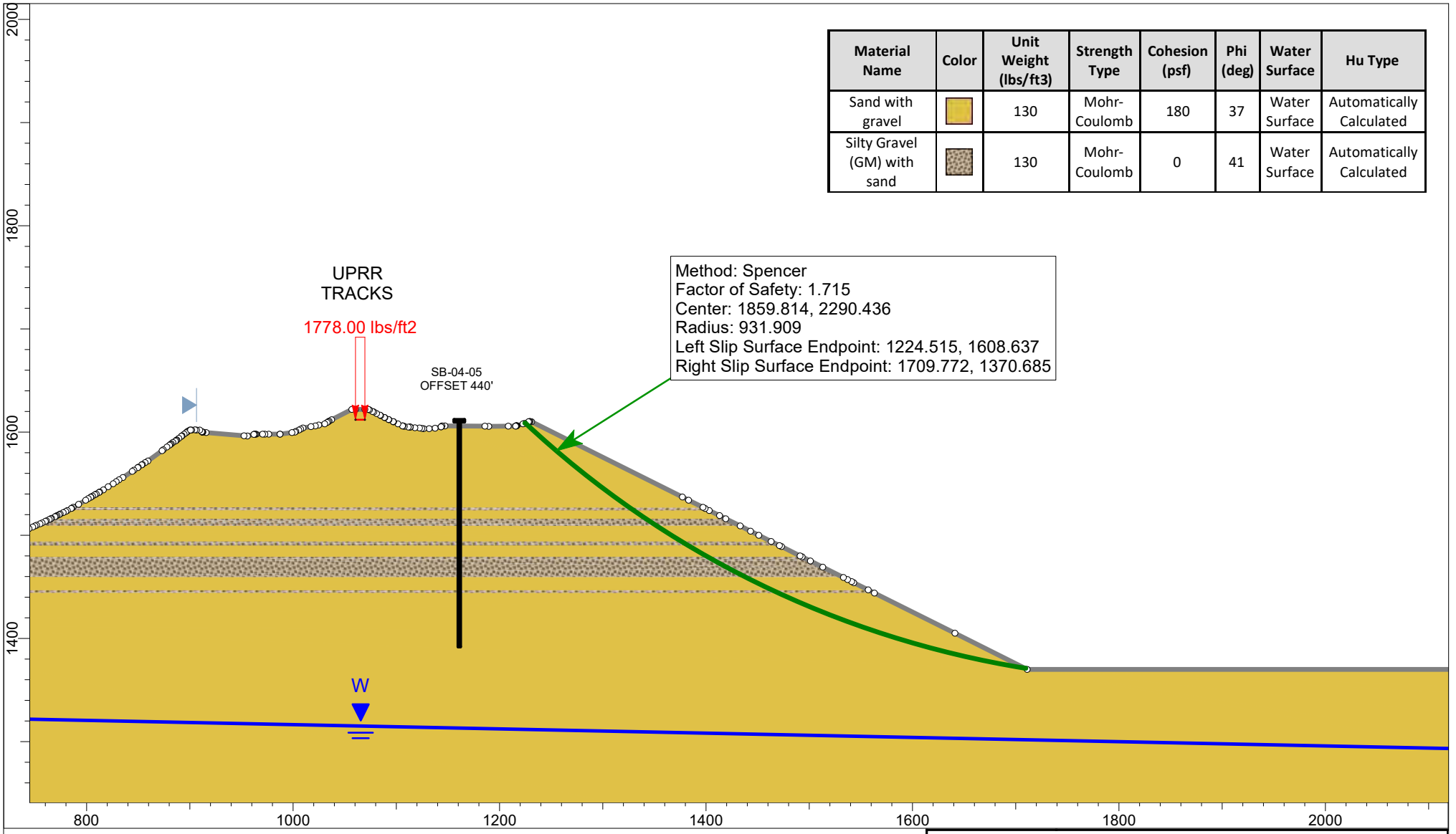
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CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION A-A' (WEST)
PSEUDOSTATIC ANALYSIS

MAY 2022

FIGURE D2

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface	Automatically Calculated
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface	Automatically Calculated



HALEY ALDRICH

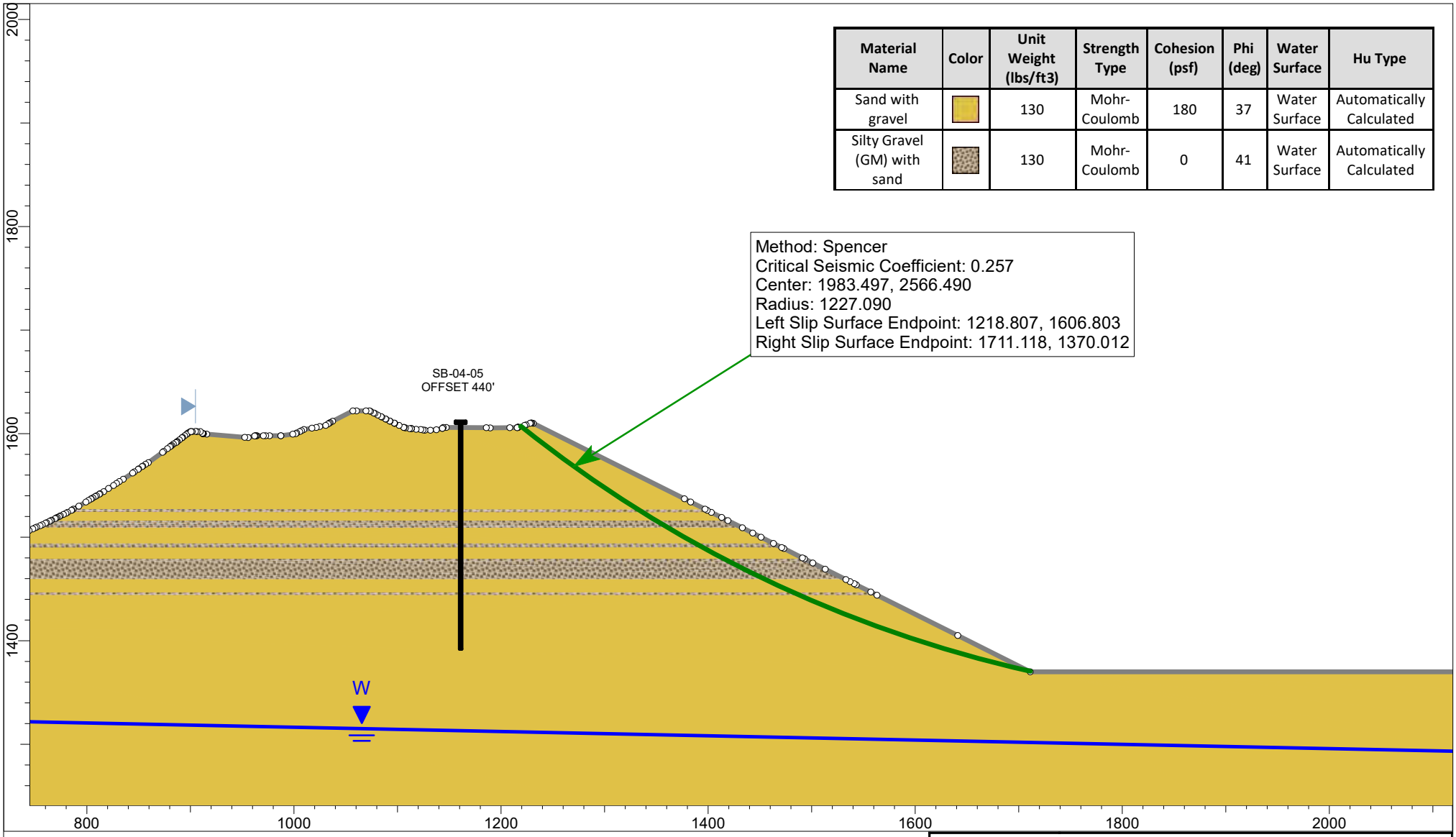
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CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION A-A' (WEST)
STATIC ANALYSIS

MAY 2022

FIGURE D1

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface	Hu Type
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface	Automatically Calculated
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface	Automatically Calculated



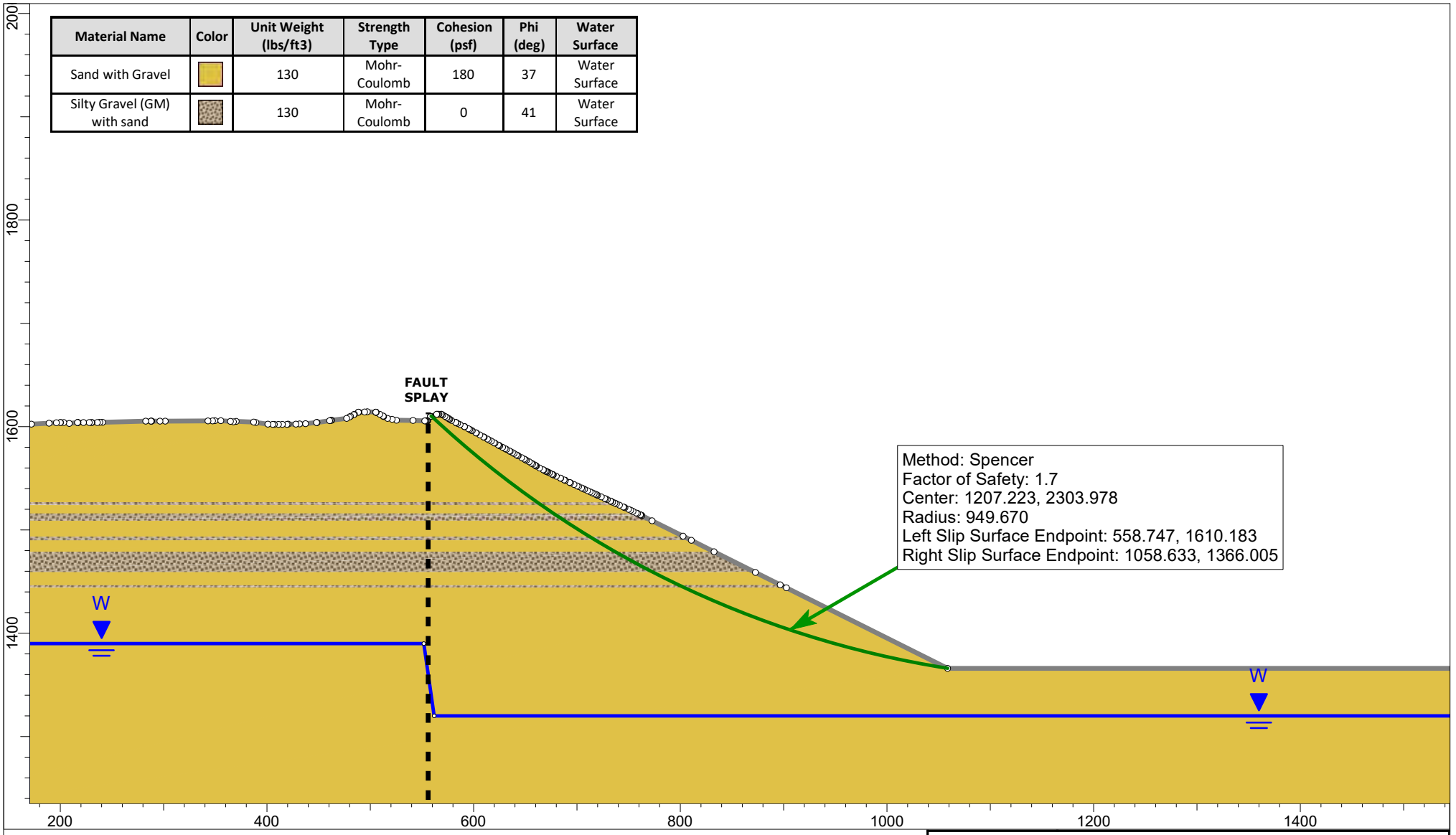
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SAN BERNARDINO COUNTY, CALIFORNIA

SECTION A-A' (WEST)
PSEUDOSTATIC ANALYSIS

MAY 2022

FIGURE D2

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with Gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface



HALEY ALDRICH

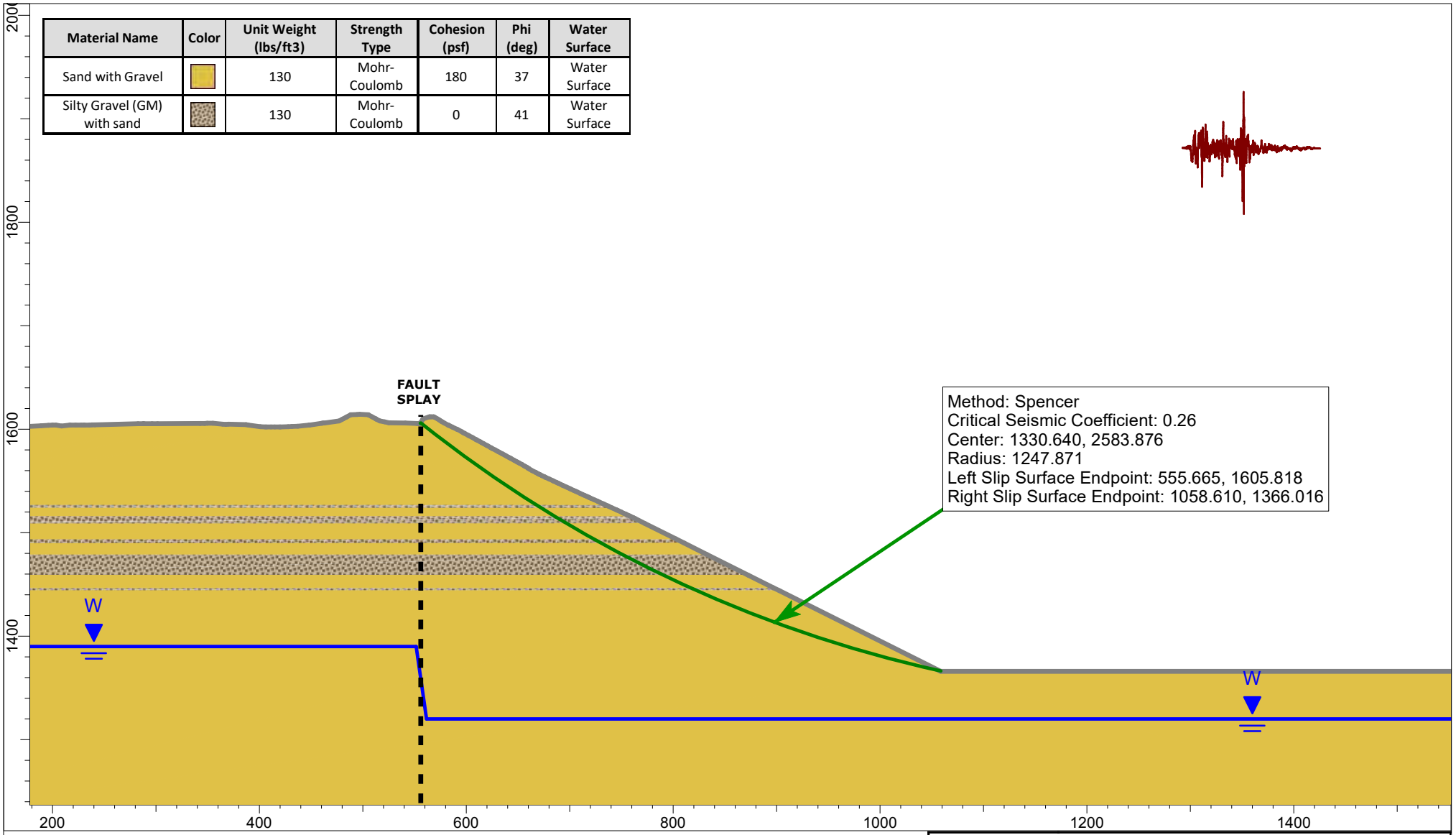
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION B-B'
STATIC ANALYSIS

MAY 2022

FIGURE D5

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with Gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface



HALEY ALDRICH

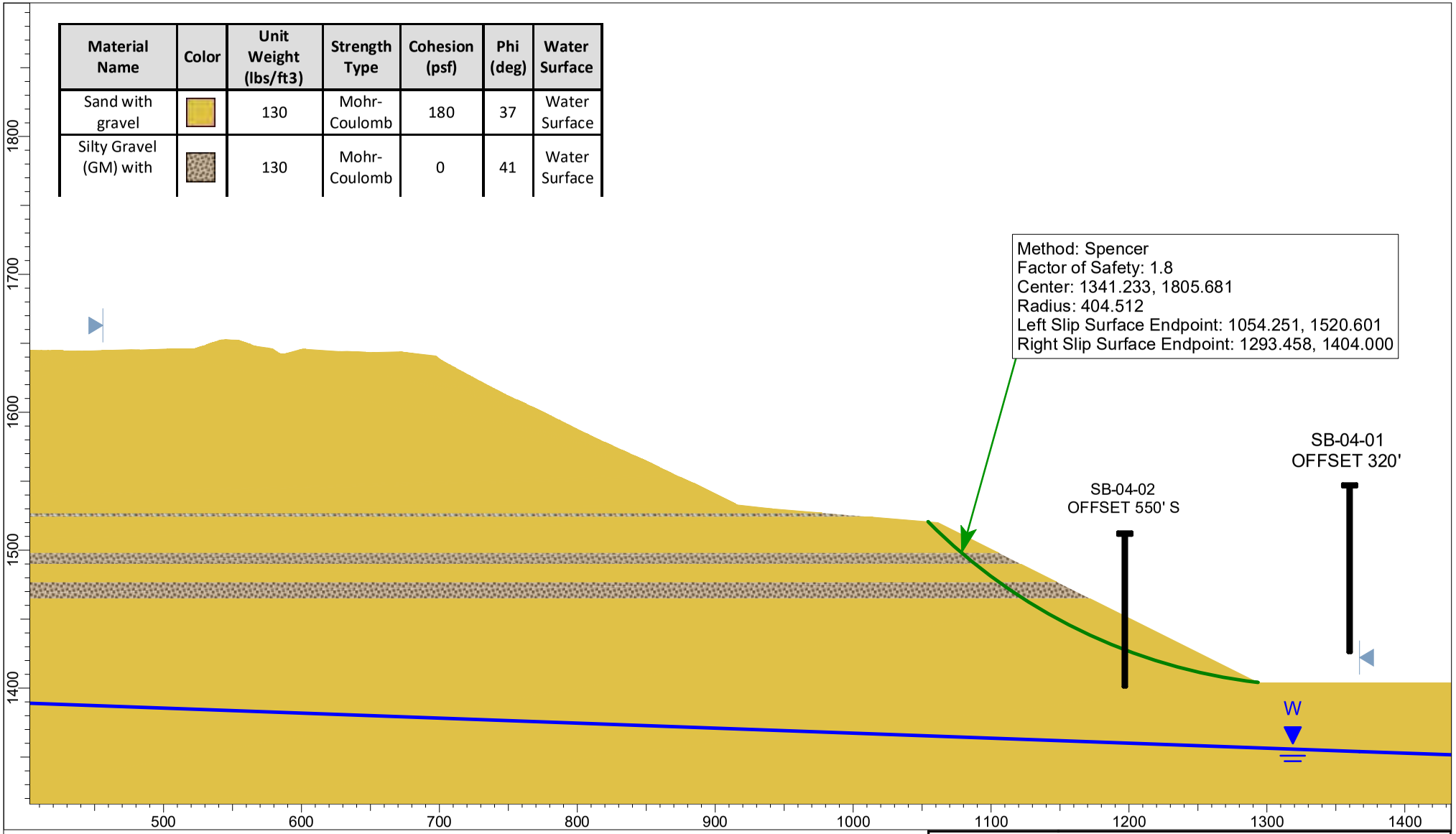
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION B-B'
PSEUDOSTATIC ANALYSIS

MAY 2022

FIGURE D6

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with		130	Mohr-Coulomb	0	41	Water Surface



HALEY ALDRICH

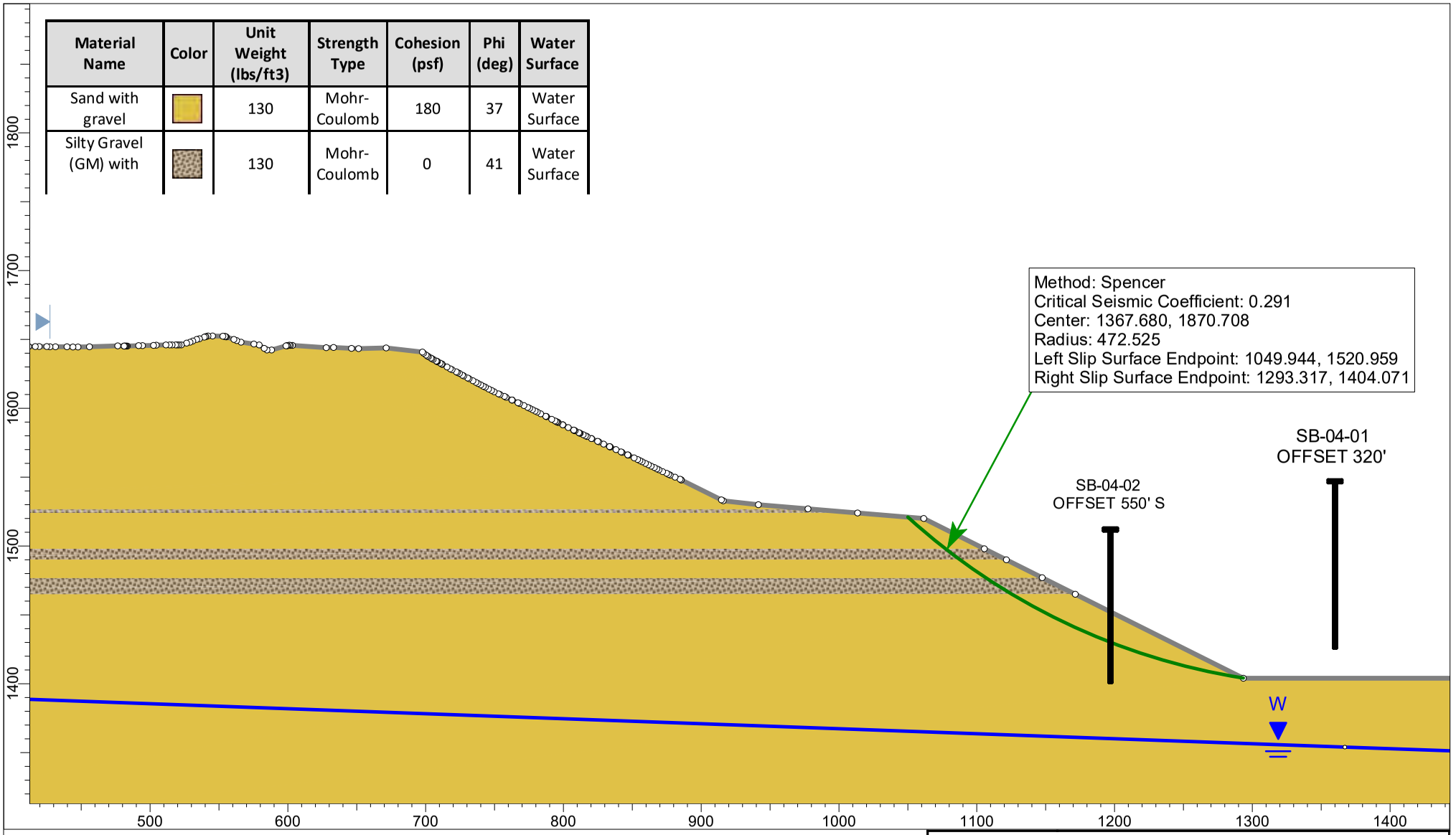
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION C-C'
STATIC ANALYSIS

MAY 2022

FIGURE D7

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with		130	Mohr-Coulomb	0	41	Water Surface



HALEY ALDRICH

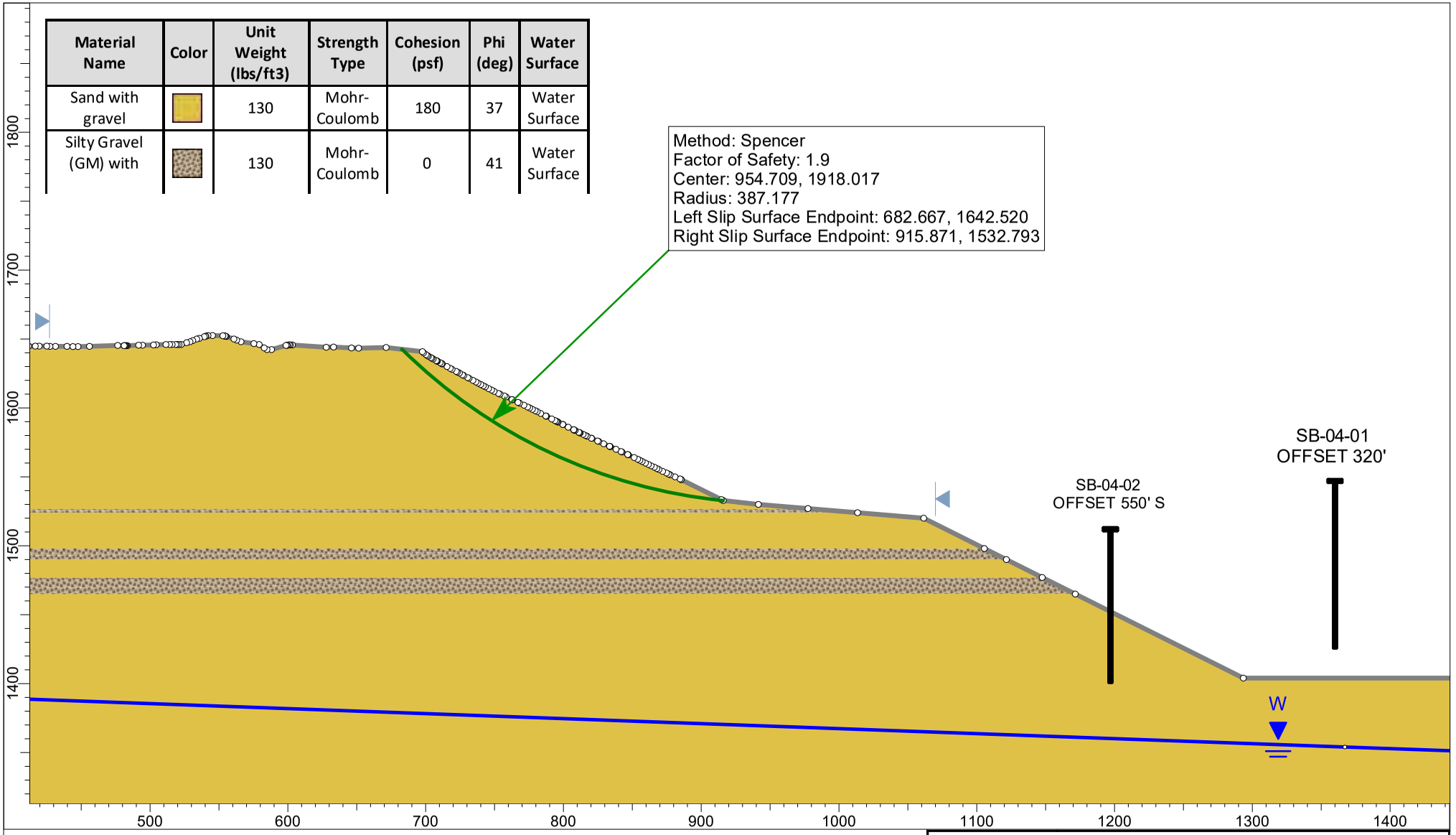
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION C-C'
PSEUDOSTATIC ANALYSIS

MAY 2022

FIGURE D8

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with		130	Mohr-Coulomb	0	41	Water Surface



HALEY ALDRICH

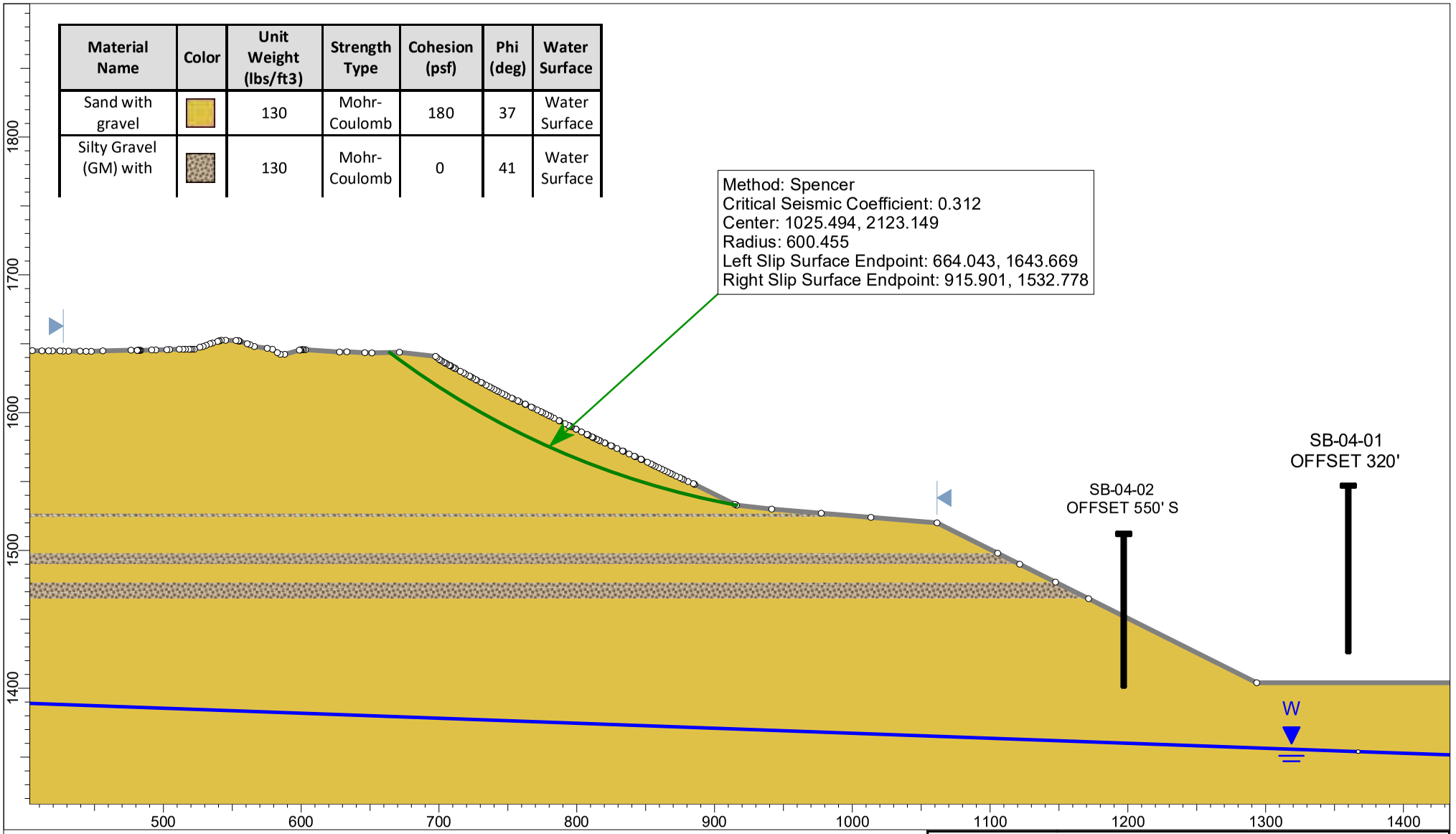
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION C-C'
STATIC ANALYSIS

MAY 2022

FIGURE D7

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with		130	Mohr-Coulomb	0	41	Water Surface



HALEY ALDRICH

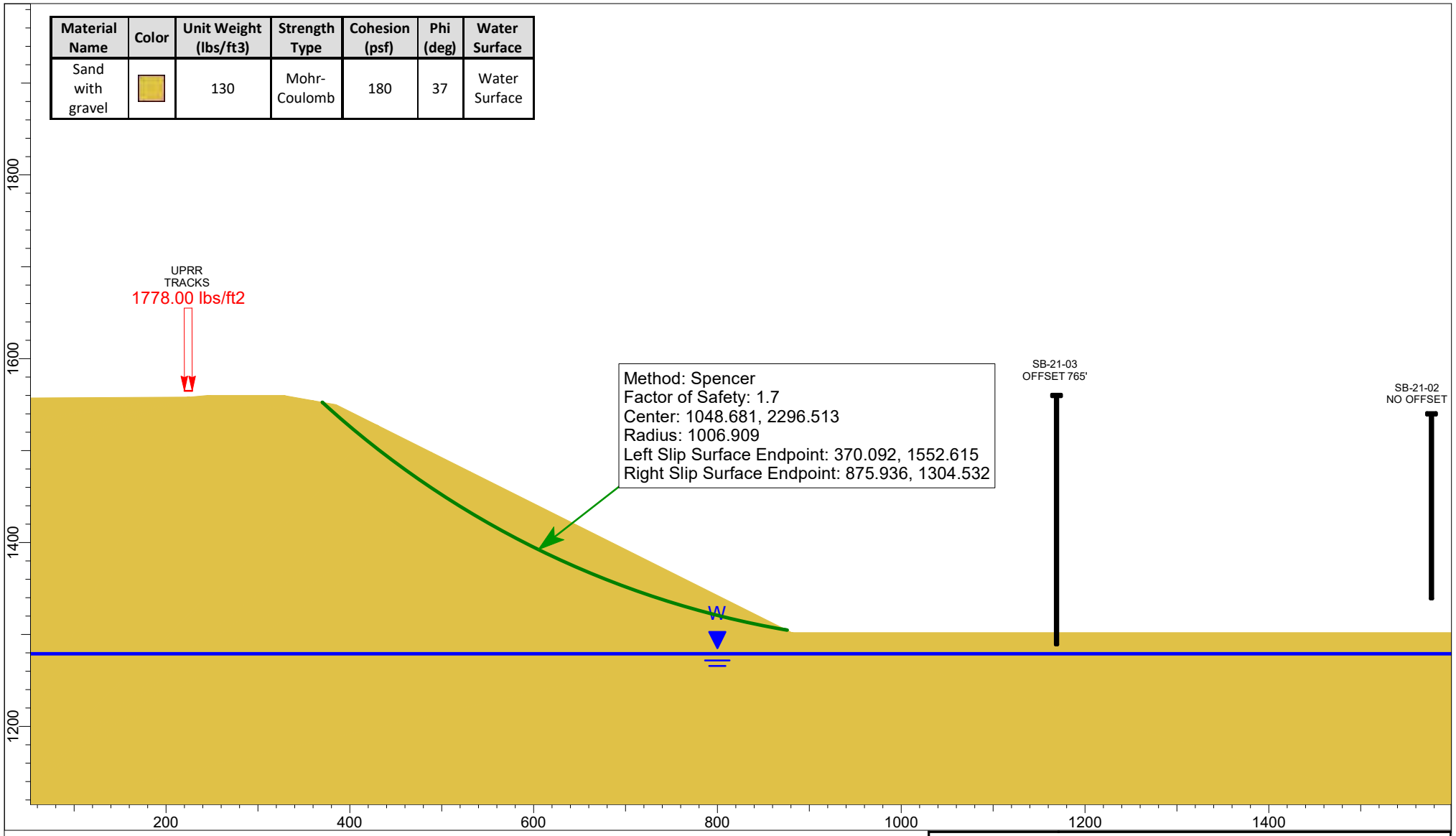
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION C-C'
PSEUDOSTATIC ANALYSIS

MAY 2022

FIGURE D8

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface



HALEY ALDRICH

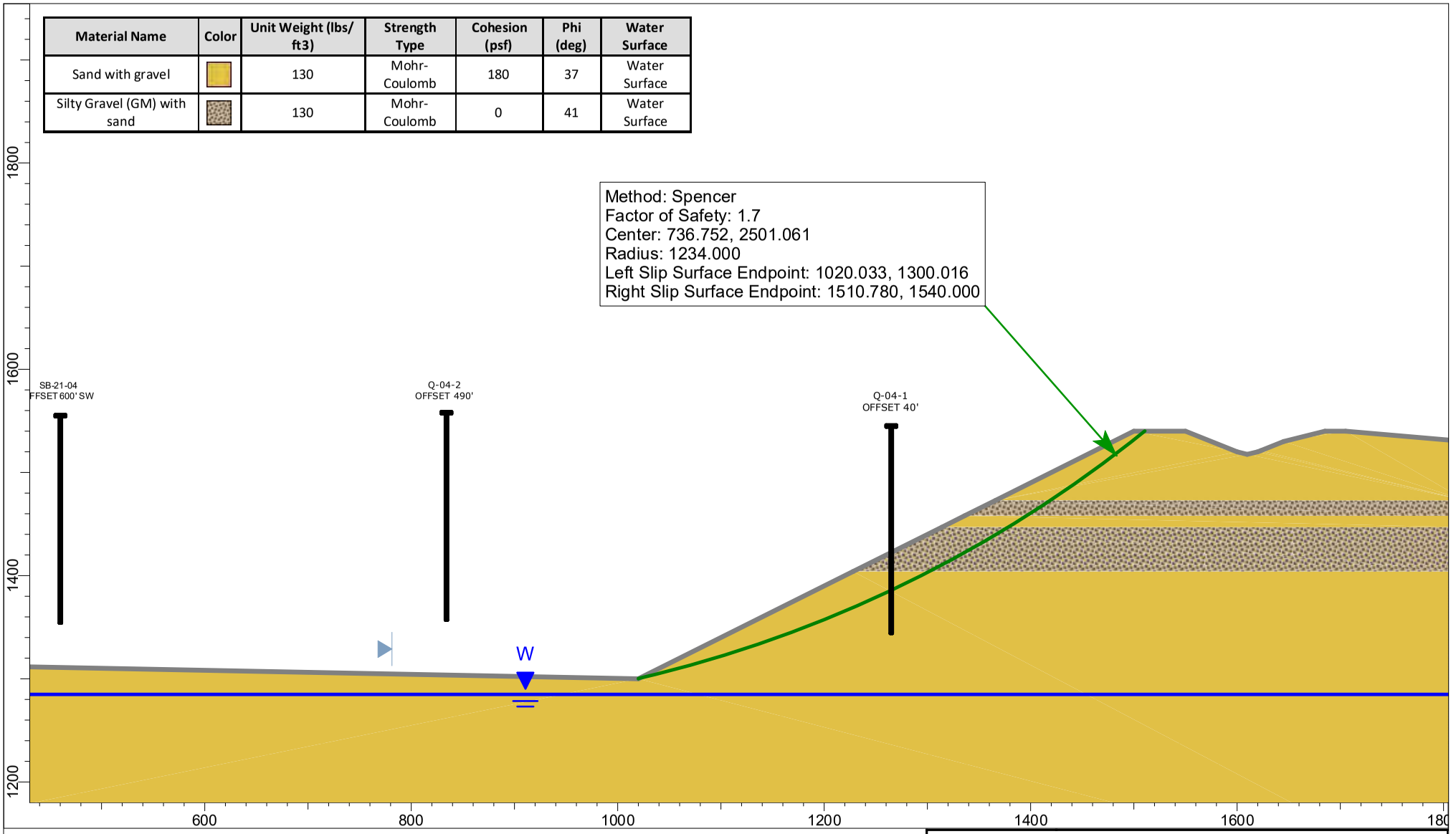
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION D-D'
STATIC ANALYSIS

MAY 2022

FIGURE D9

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface



HALEY ALDRICH

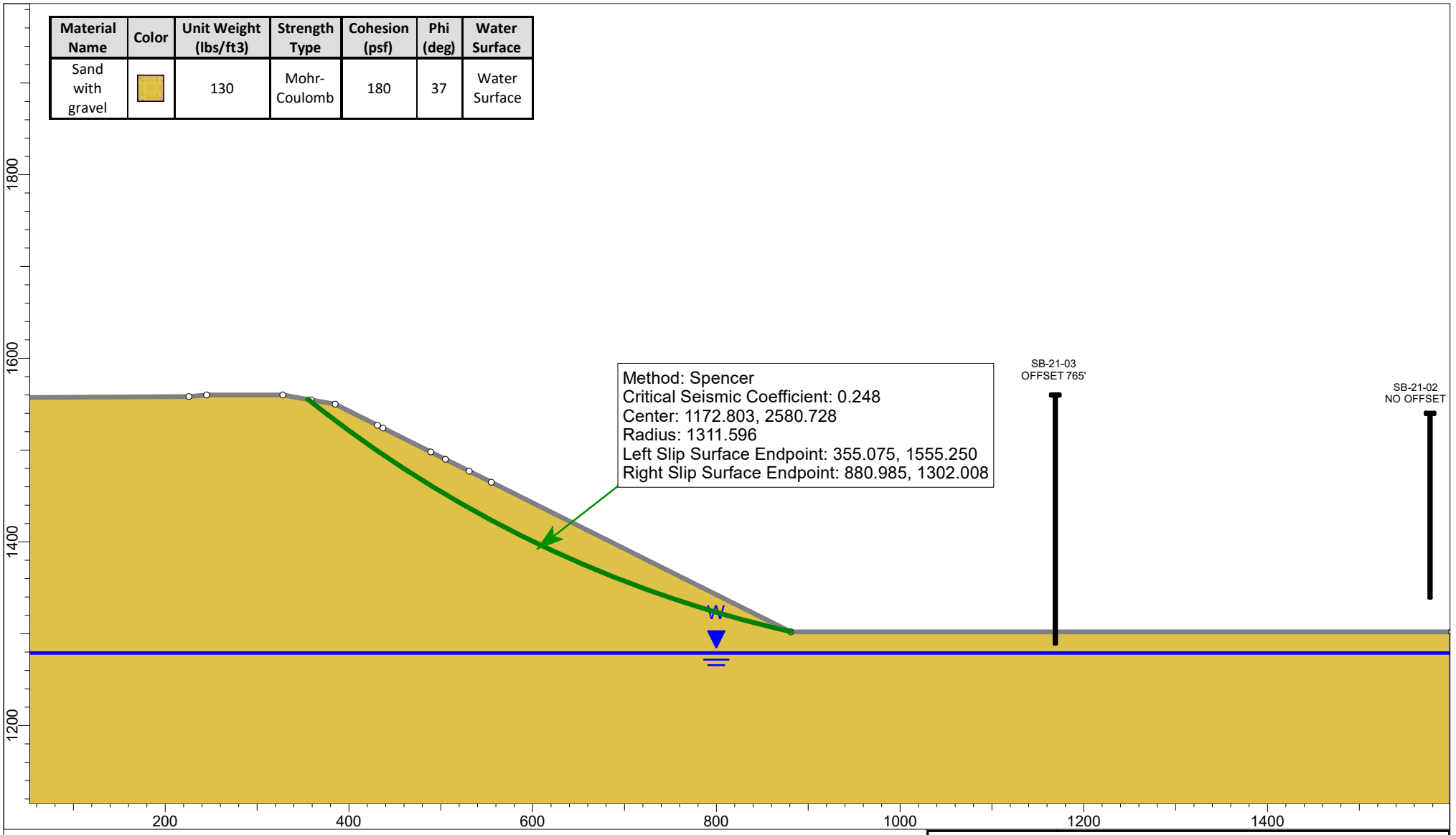
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION E-E'
STATIC ANALYSIS

OCTOBER 2021

FIGURE D11

Material Name	Color	Unit Weight (lbs/ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface



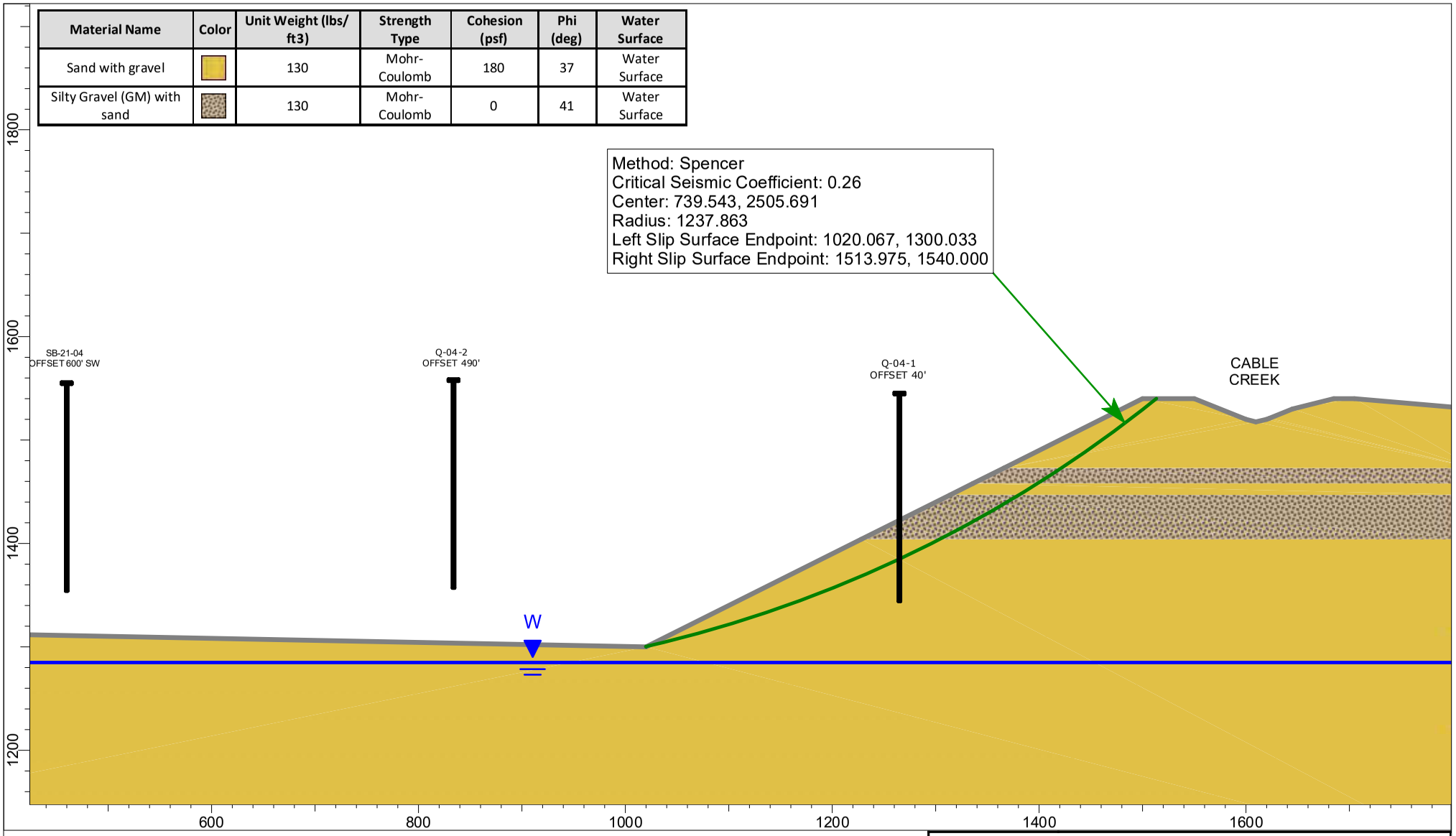
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION D-D'
PSEUDOSTATIC ANALYSIS

MAY 2022

FIGURE D10

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface



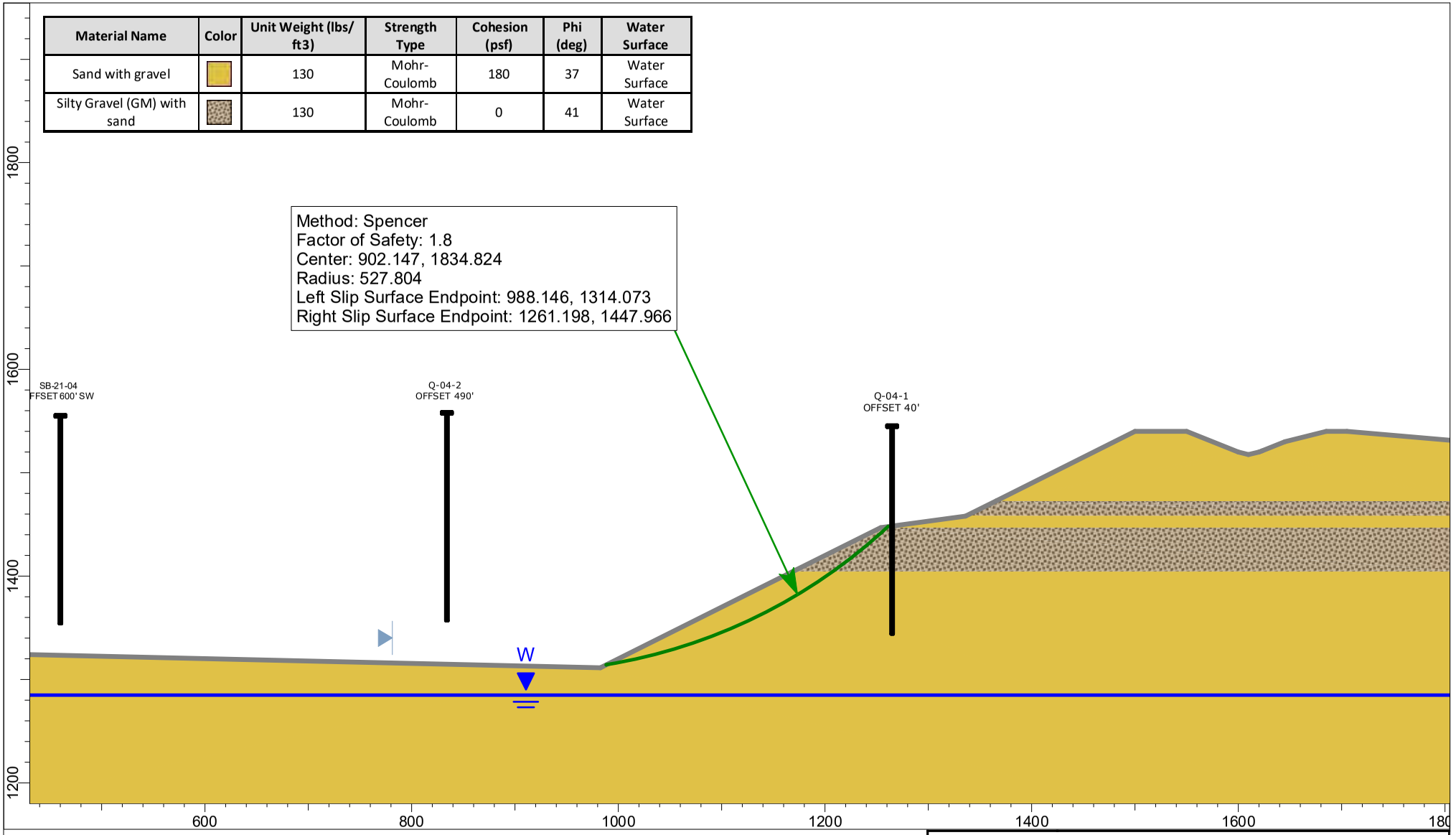
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION E-E'
PSEUDOSTATIC ANALYSIS

OCTOBER 2021

FIGURE D12

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface



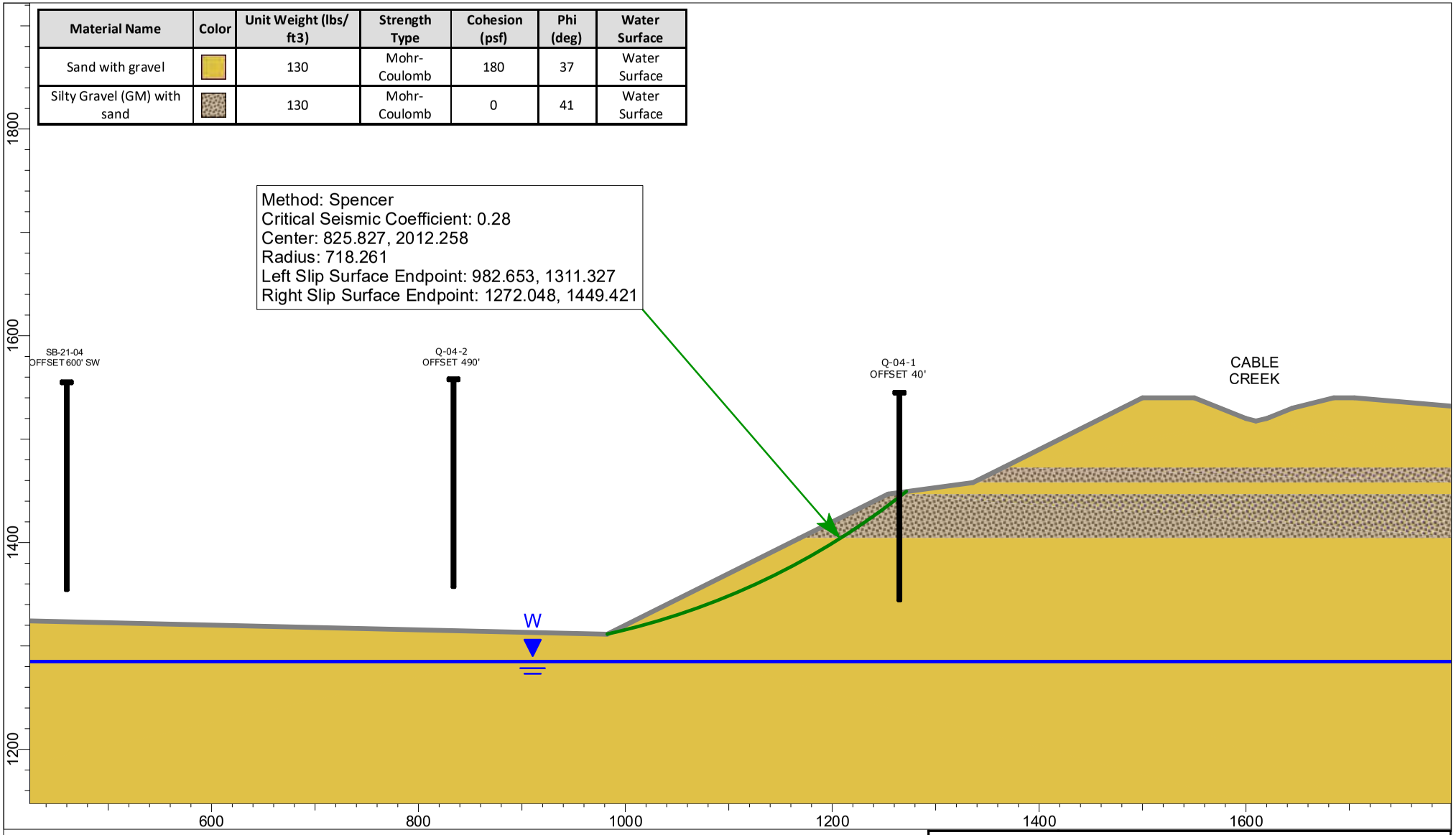
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION E-E'
STATIC ANALYSIS

MAY 2022

FIGURE D11

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface



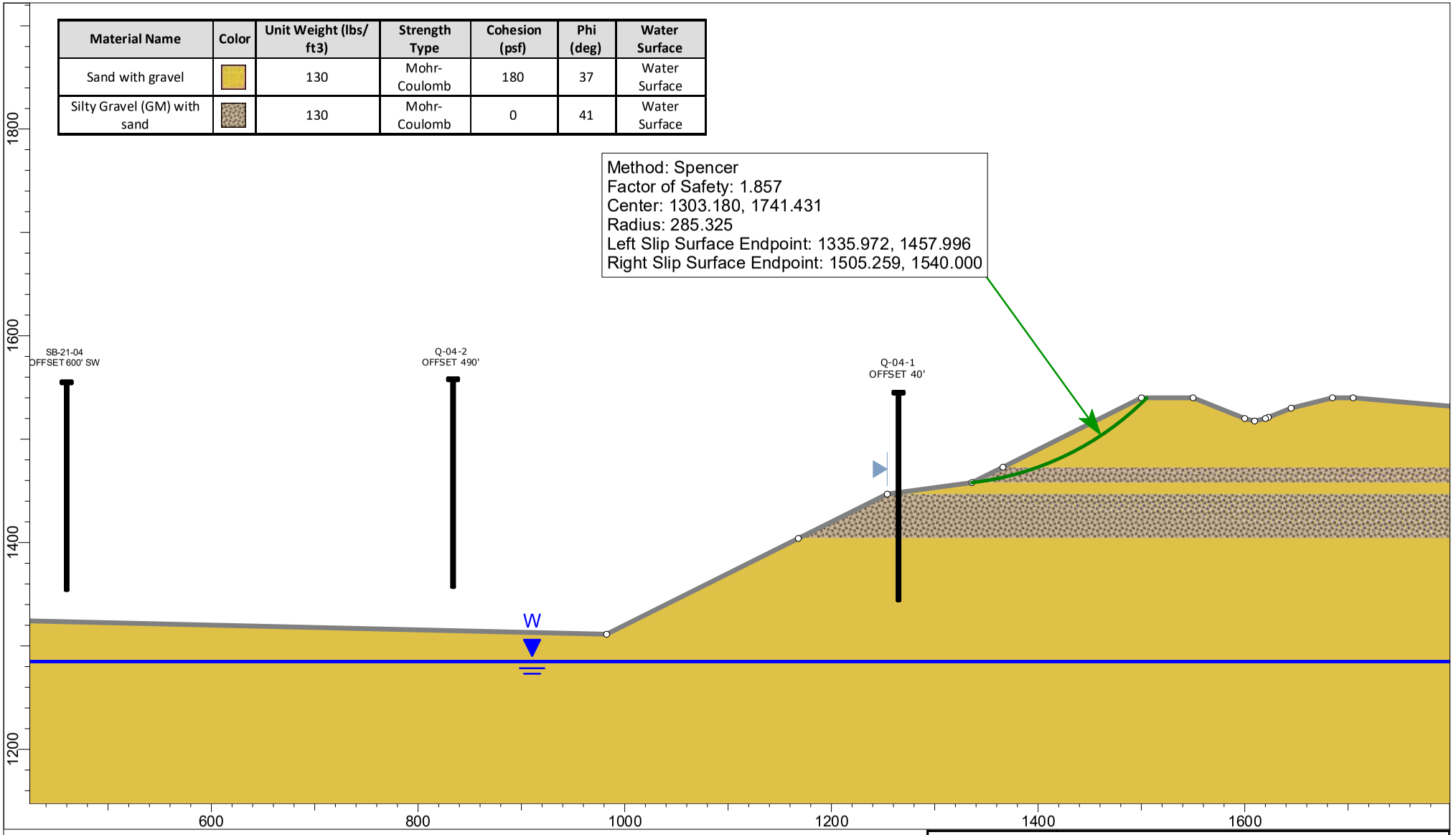
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION E-E'
PSEUDOSTATIC ANALYSIS

MAY 2022

FIGURE D12

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface



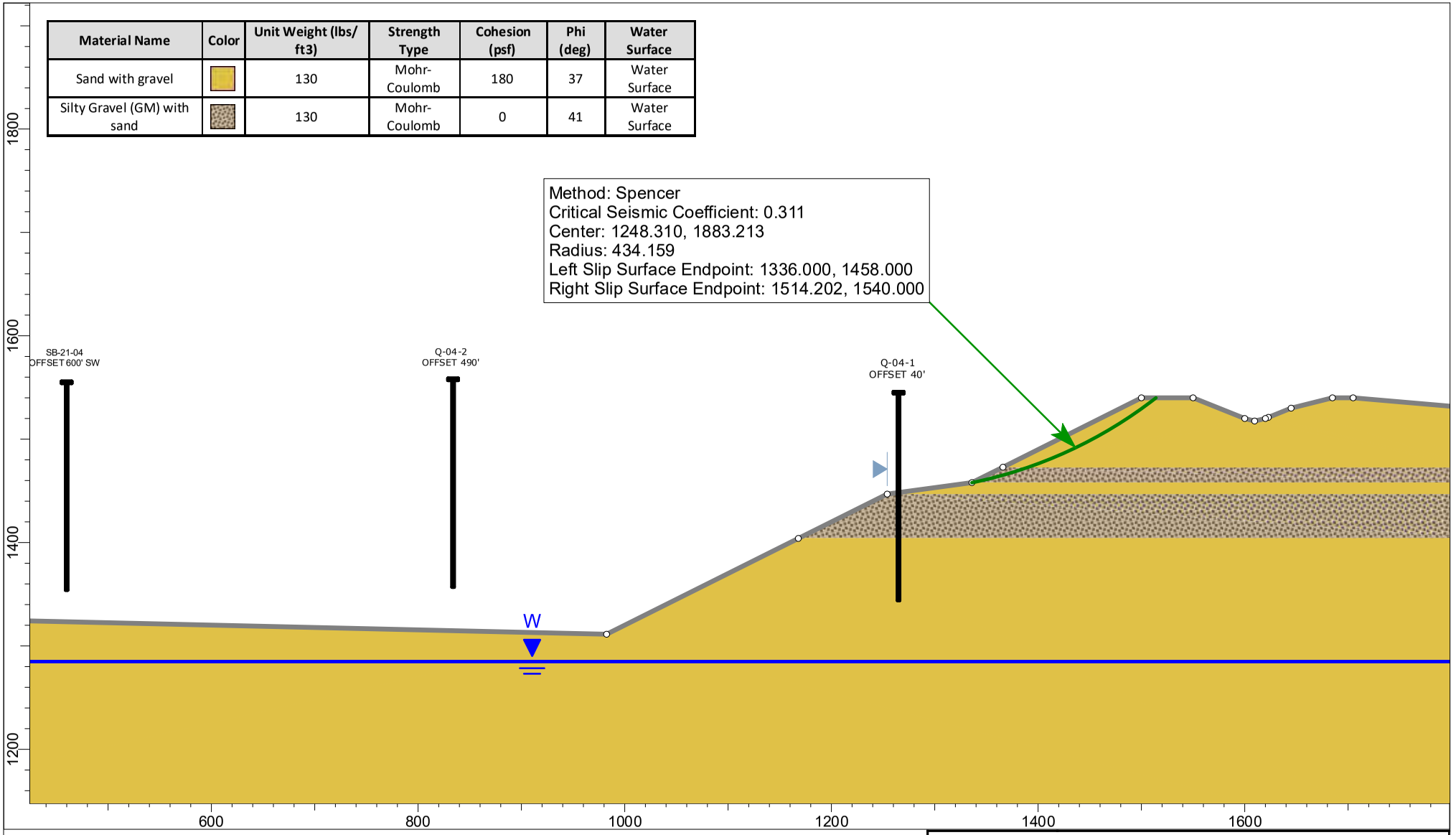
VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION E-E'
STATIC ANALYSIS

MAY 2022

FIGURE D11

Material Name	Color	Unit Weight (lbs/ ft3)	Strength Type	Cohesion (psf)	Phi (deg)	Water Surface
Sand with gravel		130	Mohr-Coulomb	180	37	Water Surface
Silty Gravel (GM) with sand		130	Mohr-Coulomb	0	41	Water Surface



HALEY ALDRICH

VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY PHASE II EXPANSION
SAN BERNARDINO COUNTY, CALIFORNIA

SECTION E-E'
PSEUDOSTATIC ANALYSIS

MAY 2022

FIGURE D12

HALEY & ALDRICH, INC.
2033 N. Main Street
Suite 309
Walnut Creek, CA 94596
925.949.1012

30 May 2023
File No. 132051-005

Harrison, Temblador, Hungerford & Guernsey LLP
2801 T Street
Sacramento, California 95816

PRIVILEGED AND CONFIDENTIAL
ATTORNEY WORK PRODUCT

Attention: Adam Guernsey
aguernsey@hthglaw.com

Subject: CEQA Geology and Soils Screening Assessment
Vulcan Materials Company Cajon Creek Quarry Consolidation Project
2400 West Highland Avenue
San Bernardino County, California

Dear Adam Guernsey:

We are pleased to submit this evaluation letter addressing California Environmental Quality Act (CEQA) Geology and Soils Appendix G criteria concerns for Vulcan Materials Company's (Vulcan) proposed Cajon Creek Quarry Consolidation Project (Project). In preparing this screening assessment, Haley & Aldrich, Inc. (Haley & Aldrich) has relied, in part, on our geotechnical evaluation report dated 30 May 2023,[1] addressing site geology, potential hazards, and engineering recommendations pertaining to the proposed mine project. The purpose of this letter is to supplement the referenced report with information specifically addressing CEQA requirements.

The Project site is located in the City of San Bernardino and in unincorporated San Bernardino County, east of Cajon Creek and north of the community of Muscoy. The Project site is bounded by residential neighborhoods to the south, Cajon Wash to the west, Historic Route 66/Cajon Boulevard to the northeast and an industrial development to the north. Nearby communities include Muscoy, the City of San Bernardino (adjacent to the east/north), and the City of Rialto (just over a mile west).

The Project calls for deepening of existing quarry pits at Areas L, M, and Q, and new aggregate material recovery and ancillary activities at Areas K and N. The proposed mining plan will effectively combine Area M and portions of Area N into a single pit, and Areas K, L, and Q into a second single pit. Each combined pit is separated by the existing Union Pacific Railroad tracks that wind through the Site in a generally north to south alignment.

As discussed in the referenced geotechnical report, we conclude that mining and future reclamation of the proposed quarry slopes up to a depth of 240 feet below ground surface (bgs) at a standard slope

[1] Haley & Aldrich, Inc., 2023. "Report on Geotechnical Evaluation, Vulcan Materials Company, Cajon Creek Quarry Consolidation Project, 2400 West Highland Avenue, San Bernardino, California." Project No. 0132051-005, dated 30 May 2023.

configuration of 2:1 (horizontal to vertical) is geotechnically feasible. Projects adhering to CEQA requirements must address several specific topics pertaining to geology and soils; these topics and our responses are presented in the remainder of this letter.

CEQA: Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to California Division of Mines and Geology Special Publication 42 (CDMG SP42).

Response: The referenced Haley & Aldrich geotechnical evaluation report includes a discussion of local and regional faults. The Glen Helen Fault (part of the San Jacinto Fault zone) trends through the southwestern tip of the Site. The State of California has delineated a Special Studies Zone offset from this fault, as shown on "State of California, Special Studies Zones, San Bernardino North Quadrangle, Official Map," dated 1 July 1974.[2] The Glen Helen Fault trace is not well-defined near the south portion of the Site. However, the City and County of San Bernardino Department of Building and Safety considers the concealed fault trend of the Glen Helen Fault a Holocene Fault and suggests that this strand is the most active portion of the San Jacinto Fault system. Although the inferred Glen Helen fault trace may not be present at ground surface, it could be found at depth, so it is possible that new quarry slopes could expose the Fault during planned mining activities.

Geologic mapping performed by Morton and Miller (United States Geological Survey [USGS], 2006)[3] indicates that a second concealed fault may cross through a portion of the site, including the southern tip of Area M and portions of Areas N and Q. However, this fault branch is not associated with a State of California Special Studies Zone.

The fault rupture hazards described above are expected to have "less than significant impact" regarding risk of loss, injury, or death, as the Project does not include the construction of occupied or habitable structures within the potential fault rupture zones.

CEQA: Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

Response: During a major earthquake, very strong to severe shaking has the potential to occur at the Site. A probabilistic seismic hazard analysis was performed using the USGS deaggregation website (https://earthquake.usgs.gov/hazards/interactive/). The deaggregation analysis utilized the USGS Dynamic Conterminous U.S. 2014 (v.4.2) edition. For this analysis, we used a shear wave velocity over the top 100 feet (30 meters) of the site (V_{s30}) of 360 meters per second, corresponding to a shear wave velocity profile at the boundary between Site Classes C and D. Based on the seismicity of faults that may

[2] California Division of Mines and Geology, 1974, State of California Special Studies Zones, San Bernardino, North Quadrangle, Official Map. Effective 1 July 1974.
[3] Morton, Douglas M. and Miller, Fred K., 2006. Geologic Map of the San Bernardino and Santa Ana 30' x 60' Quadrangles, California. USGS Open File Report 2006-1217.

impact the quarry site and the results of the deaggregation analysis, a design earthquake with a Moment Magnitude (M_w) of 7.7 was selected for the seismic hazard evaluation. The peak horizontal ground acceleration, which is based on the Maximum Considered Earthquake with a return interval of 2,500 years, or a 2 percent probability of exceedance in 50 years, is 1.63g. The risk-based site-modified peak ground acceleration (PGA_M) is 1.195g; this value was computed based on procedures outlined in American Society of Civil Engineers (ASCE) 7-16.[4]

The hazard from strong seismic ground shaking is expected to be "less than significant," based on the intended use of the site as an aggregate mine and because proposed plans do not include habitable structures.

CEQA: Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

Response: Known near-site faults, including the San Jacinto, San Andreas, and Cucamonga faults, are capable of inducing moderate to strong seismic events, which under some conditions may cause ground failure and liquefaction. Liquefaction is the process in which saturated, cohesionless soil experiences a temporary loss of strength due to the buildup of excess pore water pressure during cyclic loading resulting from earthquake ground motions. The type of soils most susceptible to liquefaction are loose, clean, saturated, uniformly graded sand and silt that have low clay content. The soil at the Site consists of fine to coarse sand, gravels, and cobbles with some silt and clay; when saturated, these soil types have potential to be susceptible to liquefaction. The soil profile at the proposed excavation depth of approximately 240 feet below ground surface (bgs) consists of very dense and non-liquefiable granular soils.

Groundwater was encountered at two of the borings conducted during Haley & Aldrich's geotechnical investigation. A boring drilled on 17 June 2021 measured groundwater at elevation 1,291 feet (163 feet below ground surface) and a boring drilled on 1 July 2021 measured groundwater elevation at 1,354 feet (143 feet below ground surface). Monitoring and supply wells located within or near the Site provide recent groundwater level information. A supply well for the quarry is located at the southwestern end of Area M. The static groundwater level at this well reportedly ranged from 190 to 222 feet below Area M's existing ground surface (310 to 342 feet below original grade) between January and June 2021. A groundwater well near the center of Area Q, designated MW-MIA 001A and monitored by San Bernardino Valley Water Conservation District (SBVWCD), reported groundwater level elevations of about 1,275 and 1,279 feet in December 2019 and December 2020, respectively.[5] Monitoring well MW-127A, located offsite and south of the intersection of Devil Creek Diversion Channel and Cajon Boulevard, reported groundwater elevations of about 1,256 and 1,255 feet in December 2019 and December 2020, respectively. Finally, a third well designated Muscoy Mutual 5, located approximately

[4] ASCE, 2017. Minimum design loads and associated criteria for buildings and other structures: ASCE/SEI 7-16.
[5] SBVWCD, 2021. "Engineering Investigation of the Bunker Hill Basin 2019-2020," Appendix A, https://www.sbvwcd.org/reports-and-data/engineering-investigation/6436-2021-draft-engineering-investigation-appendices/file

200 feet south of the southern limits of the site, reported groundwater elevations of about 1,087 and 1,082 feet in December 2019 and December 2020, respectively.

Based on the currently proposed excavation depth of approximately 240 feet bgs, we conclude the potential for liquefaction-related secondary effects, such as sand boils, lurch cracking, and lateral spreading to develop at the site following the design seismic event is low, based on the soil profiles, depth of the proposed pit and the depth to groundwater conditions.

Therefore, the hazard from seismic-related ground failure, including liquefaction, is expected to be "less than significant" for the proposed project.

CEQA: Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

Response: Haley & Aldrich performed a stability analysis of the proposed 240-foot-high quarry slopes using RocScience *Slide2*, as described in our geotechnical evaluation report. The proposed mine will include grading of new slopes at a maximum inclination of 2:1 (horizontal: vertical), according to the proposed mine and reclamation plan.

As discussed in our referenced geotechnical report, the proposed slopes were analyzed to determine static and pseudostatic (seismic) factors of safety for soil slopes by means of limit-equilibrium analysis. Final reclaimed slopes with an inclination of 2:1 are in conformance with Surface Mining and Reclamation Act's prescriptive standards for slope stability (14 Cal. Code Regs., § 3704(d)) and are, therefore, presumptively stable. Notwithstanding, stability analyses were performed to calculate the proposed final reclaimed static and pseudostatic slope stability. Slope stability analyses indicate that the proposed quarry slopes have static factors of safety ranging from 1.5 to 1.9, which are considered acceptable for the proposed project design features and are considered stable slope configurations for the project's proposed end use of open space. Pseudo-static analyses performed in combination with the Bray and Macedo procedure indicate that the proposed quarry slopes are expected to experience seismic-induced displacements of up to about 2.4 to 3.9 feet (84 percent confidence level) following the design-level seismic event. The failure surfaces associated with these displacements are not expected to significantly impact existing or proposed onsite or offsite improvements given the nature of the use and the proposed end use of open space.

The hazard from landsliding is expected to be "less than significant," as the calculated factors of safety for the proposed slopes are acceptable based on California Geological Survey Special Publication 117A,[6] and calculated pseudostatic displacements are not expected to significantly impact existing or proposed onsite or offsite improvements.

[6] California Geological Survey, 2008. Special Publication 117A Guidelines for Evaluating and Mitigating Seismic Hazards in California.

CEQA: Would the project result in substantial soil erosion or the loss of topsoil?

Response: The site is located in a wash area that is not used agriculturally. Haley & Aldrich performed a site visit on 5 May 2018, during which time we assessed visible surface geology conditions at the site and adjacent areas. Our observations of the exposed site geology generally coincide with the description on the USDA Soil Survey Map[7] covering the site area, which maps site geology consisting of Soboba Stony Loamy Sand (SoC) and the Tujunga Gravelly Loamy Sand (TvC). The Soboba Stony Loamy Sand consists of coarse sand, sand to loamy sand to fine loamy sand with gravels, and cobbles. The Tujunga Gravelly Loamy Sand (TvC) consists of fine sand and sandy loam.

The proposed project will effectively combine Area M and portions of Area N into a single pit, and Areas K, L, and Q into a second single pit, which will collect drainage from the affected area in the pit and reduce the potential for eroded material to leave the site.

Therefore, this project is expected to have "less than significant impact" on soil erosion or the loss of topsoil.

CEQA: Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Response: The site subsurface consists primarily of alluvial deposits of various ages and thicknesses, which correspond to different flood events during large rainstorms. As discussed in the referenced geotechnical report, borings performed at the site to a maximum depth of 270 feet bgs revealed a subsurface with granular alluvial deposits typically consisting of silty sand, silty gravel, cobbles, and boulders. Based on these lithologies, the existing geologic unit that the Project is located on is stable.

Landsliding and liquefaction-related hazards are addressed above in this letter.

The proposed project will remove large volumes of soil from the excavation area, reducing overburden pressures. Therefore, the project is expected to have "no impact" on inducing subsidence or collapse of geologic units at the site.

CEQA: Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Response: Haley & Aldrich performed a site visit on 5 May 2018, during which time we assessed visible surface geology conditions at the site and adjacent areas. Our observations of the exposed site geology generally coincide with the description on the United Stated Department of Agriculture (USDA) Soil Survey Map[7] covering the site area, which maps site geology consisting of Soboba Stony Loamy Sand (SoC) and the Tujunga Gravelly Loamy Sand (TvC). The Soboba Stony Loamy Sand consists of coarse

[7] USDA, National Resources Conservation Service, Soil Survey Maps. https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

sand, sand to loamy sand to fine loamy sand with gravels, and cobbles. The Tujunga Gravelly Loamy Sand (TvC) consists of fine sand and sandy loam. Neither of these soil types includes expansive clay, nor did we observe significant amounts of expansive clay within exposed soils during our site visit.

The proposed project is expected to have "no impact" from expansive soil.

CEQA: Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

Response: The site reclamation plan currently calls for the site to be left as open space without any structures requiring sewage or water facilities at the completion of reclamation. As such, septic tanks or sewer connections will be unnecessary. Therefore, the project is expected to have "no impact" with regard to waste water disposal.

CEQA: Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Response: The summary that follows is taken from a letter dated 3 April 2018 from Dr. Samuel McLeod of the Los Angeles County Natural History Museum regarding vertebrate paleontology resources at the site (Appendix A). The site surface sedimentary deposits consist of late Holocene alluvial deposits in an active wash environment which has been shaped by both deposits and erosion during large rainstorms and corresponding flood events. These deposits are not unique to the site; elsewhere, these deposits typically do not contain significant vertebrate fossils. If mining proceeds to underlying older Quaternary sedimentary deposits (at an unknown depth), it is possible remains of fossil vertebrates may be encountered, as have been found at sites a significant distance (approximately 15 to 20 miles) south-southwest of the project site. Should vertebrate fossils be encountered during mining, Haley & Aldrich recommends the following: (1) cease further excavation in the immediate area; (2) assess the vertebrate fossil material using a qualified paleontologist; and (3) implement recommendations of the qualified paleontologist, if applicable. However, the project site boundary does not contain sedimentary deposits unique to the surrounding area. There are no unique geological resources present on-site.

As the nearest remains of fossil vertebrates were found approximately 15 to 20 miles south-southwest of the project site, the project will have a "less than significant impact" with respect to paleontological resources or site specific unique geologic features.

We appreciate the opportunity to provide our services to you on this project. If you have any questions, please call us at 971-327-9115.

Sincerely yours,
HALEY & ALDRICH, INC.

Micah D. Hintz, P.E., G.E.
Project Manager

Catherine H. Ellis, P.E., G.E.
Senior Associate, Geotechnical Engineer



Attachment:
Appendix A - Letter dated 3 April 2018 from Dr. Samuel McLeod

\\haleyaldrich.com\share\CF\Projects\0132051\-005 Area Q Phase II Geotech\Deliverables\2022_CEQA\Final_R2\2023_0530_HAI_Final Geotechnical Supplement_F.docx

APPENDIX A
Letter dated 3 April 2018 from Dr. Samuel McLeod

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
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3 April 2018

BCR Consulting
505 West 8th Street
Claremont, CA 91711

Attn: David Brunzell, Principal Investigator / Archaeologist

re: Paleontological resources for the Vertebrate Paleontology Records Search for the proposed Vulcan Area Q Project, near Muscoy, San Bernardino County, project area

Dear David:

I have conducted a thorough check of our paleontology collection records for the locality and specimen data for the proposed Vulcan Area Q Project, near Muscoy, San Bernardino County, project area as outlined on the portion of the San Bernardino North USGS topographic quadrangle map that Nicholas Shepetuk sent to me via e-mail on 20 March 2018. We do not have any vertebrate fossil localities that lie directly within the proposed project area, but we do have localities farther afield from sedimentary deposits similar to those that may occur subsurface in the proposed project area.

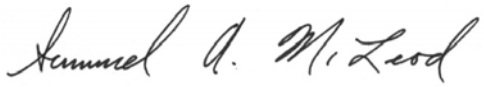
Surface deposits in the entire proposed project area are composed of younger Quaternary Alluvium, derived as alluvial fan deposits from the San Gabriel Mountains to the north, primarily via Cajon Wash that currently flows adjacent to the southwestern border of the proposed project area and from Cable Creek that currently flows in a channel forming the southeastern border of the proposed project area. These deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers, but they may be underlain at relatively shallow depth by older sedimentary deposits that do contain significant fossil vertebrate remains. Our closest fossil vertebrate locality from similar older Quaternary deposits is LACM 7811, quite some distance to the west-southwest of the proposed project area west of Mira Loma along Sumner Avenue, that

produced a fossil specimen of whipsnake, *Masticophis*, at a depth of 9 to 11 feet below the surface. Even further to the southwest between Corona and Norco our vertebrate fossil locality LACM 1207 produced a fossil specimen of deer, *Odocoileus*.

Shallow excavations in the younger Quaternary Alluvium exposed throughout the proposed project area are unlikely to encounter significant vertebrate fossils. Deeper excavations that extend down into older Quaternary deposits, however, may well encounter significant remains of fossil vertebrates. Any substantial excavations in the sedimentary deposits in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,



Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

APPENDIX F

Water Supply Assessment
(Sespe Consulting, Inc. – 2022)

SESPE
CONSULTING, INC.

374 Poli Street, Suite 200 • Ventura, California 93001

WATER SUPPLY ASSESSMENT

CAJON CREEK QUARRY CONSOLIDATED PROJECT

Vulcan Materials Company – Western Division
San Bernardino County, California

November 2022

Prepared for:

Vulcan Materials Company – Western Division
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_____

Lori L. Bryan
Project Geologist
Sespe Consulting, Inc.

Water Supply Assessment
Cajon Creek Consolidated Quarry
Vulcan Materials Company – Western Division

November 2022

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WATER SUPPLY ASSESSMENT

Cajon Creek Quarry Consolidated Project
Vulcan Materials Company

November 2022

1.0 EXECUTIVE SUMMARY

The Vulcan Materials Company – Western Division (Vulcan) operates two separate and adjacent surface mining and processing operations in the City and County of San Bernardino. The existing Area Q Quarry is in the County of San Bernardino (County). The existing Cajon Creek Quarry is in the City of San Bernardino (City). Figure 1 displays the locality of both existing quarries.

In 1993, the City approved entitlements for the Cajon Creek Quarry, which included a Specific Plan (SP No. 90-01), Conditional Use Permit (91-31), and Reclamation Plan that authorized development of the Cajon Creek Quarry, subject to approval of a Development Permit (97-24). The City subsequently approved Development Permits that authorized Vulcan to begin operations at the Cajon Creek Quarry and amended certain aspects of the Specific Plan and Conditional Use Permit. Within the Cajon Creek Quarry/Specific Plan, mining is currently permitted only in planning Areas M and L. The Project as proposed (see detailed descriptions below) will permit a change in use to allow for mining in Area K (currently permitted for Light Industrial) and Area N (currently permitted for mineral processing,). All existing entitlements issued by the City for the Cajon Creek Quarry have been subject to previous review under the California Environmental Quality Act (CEQA).

In addition to the Cajon Creek Quarry, Vulcan also obtained approval of a Conditional Use Permit and Reclamation Plan (CUP/PROJ-2019-00073) in 2020, that authorized mining and ancillary uses at the Area Q Quarry, which lies adjacent to the southern portion of the Cajon Creek Quarry in the County of San Bernardino (County). Vulcan began operations at the Area Q Quarry in late 2021. All entitlements issued by the County for the Area Q Quarry were also subject to review under CEQA.

Currently, Vulcan intends to consolidate the Cajon Creek Quarry and the Area Q Quarry into one surface mining operation under a single Reclamation Plan. In detail, the Project would amend the Cajon Creek Specific Plan to authorize mineral resource recovery within planning Area K and on a portion of planning Area N, increase mining depth in planning Areas L and M from 120-feet to 240-feet below ground surface (bgs), and permit daylighting between planning Areas M and N and between planning Areas K and L and the Area Q Quarry. The Project would also amend the Mining Plan and Reclamation Plan for the Area Q Quarry to increase mining depth from 120-feet to 240-feet bgs. No other elements of the existing entitlements or mining processes for the Cajon Creek Quarry and the Area Q Quarry would change. Figure 2 shows the proposed Consolidated Cajon Creek Quarry and the existing permitted material extraction areas.

The Cajon Quarry Consolidated Project (herein referred to as the Project) will contain approximately 486 acres and would extract approximately 73.7 million tons of the bank deposit over an estimated 55-year period, depending on actual market demand. As part of the operations, groundwater pumped from an existing onsite well (herein referred to as the Area M well) is and will continue to be used for Project dust

control and to support revegetation during site reclamation. Based on the Water Supply Assessment (WSA) previously prepared for the Area Q project (Haley & Alrich, 2020); the Area M well provides approximately 19.5-acre-feet of water per year for dust control and irrigation water. The Haley & Aldrich (2020) WSA determined that the 19.5-acre foot demand would remain unchanged for the Area Q project, since there would be no increase in the annual amount of material extraction as part of that project. Likewise, the Project would continue to use water from the Area M well for dust control and irrigation. Since the average annual rate of material extraction would remain constant, the amount of water used for dust control would not change; and therefore the Project would not create any new consumptive use.

As required under the California Environmental Quality Act (CEQA), this Water Supply Assessment (WSA) provides the pertinent information needed to determine the potential significance of environmental effects related to water resources; more specifically when considering the Project's potential to impact groundwater. The analyses performed as part of the WSA indicate the proposed Project would not:

1) violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality;
2) deplete groundwater supplies or interfere with groundwater recharge, resulting in an adverse effect on aquifer yield or groundwater levels, or result in direct or indirect adverse effects to other users;
3) conflict with or otherwise impede the implementation of a water quality control plan or sustainable groundwater management plan, or groundwater management policies as defined by the California Sustainable Groundwater Management Act (SGMA);
4) increase water use above that of existing baseline conditions.

Collectively, comparison with these criteria demonstrate the Project's impact would be less than significant, therefore require no mitigation, and the water resources can meet the forecasted demand under normal, single dry, and multiple dry years.

2.0 INTRODUCTION

2.1 Project Background

The Project proposes to consolidate mining operations among the existing approved Cajon Creek and Area Q quarries, as well as the corresponding auxiliary mining activities, which includes industrial/haul truck and aggregate extraction and processing, and the currently permitted hot mix asphalt batching and recycle operations. This Project will allow Vulcan to continue to provide high-quality aggregate materials to serve both the local and regional market and ensure the continued operation of Vulcan's Cajon Creek and San Bernardino facilities by providing a continuous supply of construction material products.

This WSA has been prepared for Vulcan in support of San Bernardino County's and the City of San Bernardino's environmental review of the Project, as required by CEQA. This WSA follows the requirements of California Water Code § 10910 and provides the pertinent water supply information pursuant to California Senate Bill 610, as described in the *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001 to Assist Water Suppliers, Cities, and Counties in Integrating Water and Land Use Planning* (DWR, 2003).

Vulcan owns and operates the Cajon Creek Quarry located in the City of San Bernardino and the Area Q Quarry in San Bernardino County, California (Figure 2). The existing quarries are adjacent to each other, and both are permitted for mining aggregate and auxiliary mining activities, and both have site-specific

Surface Mining and Reclamation Act (SMARA) Reclamation Plans. Additionally, a hot mix asphalt batch plant presently operates at the Cajon Creek Quarry under a use permit issued by the City. As part of the Cajon Creek Quarry entitlements, the City approved a Specific Plan which identifies the individual site uses according to discrete planning areas. The Cajon Creek Reclamation Plan covers planning Areas L, M, and N. Areas M and L are designated for mining. Adjoining Area M to the south is planning Area N, which is currently permitted for material processing. Together, planning Areas L, M, N and comprise approximately 298 acres. Vulcan owns an additional 36 acres referred to as Area K, which is adjacent to the eastern border of Area L. Planning Area K is currently designated in the Specific Plan for Light Industrial use.

The Area Q Quarry is in unincorporated San Bernardino County directly South of the Cajon Creek Quarry Area L and east of Area N, which is approved under a County Conditional Use Permit for mining and related ancillary uses. The Area Q site contains approximately 196 acres. As discussed previously, this Project would combine Areas L, M, N and K with the Area Q Quarry under a single reclamation plan.

The Project site is in a non-sectioned portion of Township 1 North, Range 5 West, San Bernardino Baseline and Meridian. The Project site consists of a total of 486 acres and comprises multiple parcels, as shown on Figure 2. Areas K, L, M, and N are currently situated in the City of San Bernardino. Area Q is currently in the County.

The Project is located within the San Bernardino Basin Area (SBBA) (Bulletin 118 Subbasin No. 8-002.06), a subbasin within the larger Upper Santa Ana Valley Groundwater Basin. The SBBA has a surface area of approximately 141 square miles and lies between the San Andreas and San Jacinto faults. The basin is bordered on the northwest by the San Gabriel Mountains and Cucamonga fault zone; on the northeast by the San Bernardino Mountains and San Andreas fault zone; on the east by the Banning fault and Crafton Hills; and on the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands. Alluvial fans extend from the base of the mountains and hills that surround the valley and coalesce to form a broad, sloping alluvial plain in the central part of the valley (IRUWMP, 2020). The SBBA was adjudicated in 1969 and is managed pursuant to the Western-San Bernardino Judgment (Western Judgment, 1969).

The SBBA is comprised of two hydrologically distinct groundwater basins, the Bunker Hill subbasin and the Lytle Creek subbasin, that are collectively included in the Western Judgment but have historically been recognized by local agencies as distinct groundwater basins given their hydrogeologic characteristics. While some earlier studies do not distinguish the Lytle Creek basin from the Bunker Hill as formal basins for groundwater management, for this WSA they are recognized as distinct groundwater basins, as they are separated by hydrologic barriers (Danskin, et al., 2006, (URS, 1993). In prior version of California's Groundwater Bulletin 118, the Bunker Hill and Lytle Creek subbasins were both referred to as the "Bunker Hill Subbasin" (Basin No. 8-002.06). In 2016, the California Department of Water Resources approved a basin boundary modification request on behalf of Valley Water and other adjacent water suppliers to combine other recognized subbasins within the Upper Santa Ana River Groundwater Basin into the Bunker Hill Subbasin. In the 2020 updated version of Bulletin 118, the reconfigured subbasin that includes Bunker Hill and Lytle Creek subbasins is referred to as the SBB or SBBA.

The existing Area M groundwater supply well is sourced from the Lytle Creek subbasin and is used for dust control associated with mining and conveyance of materials in Areas L and M, as well as for irrigation water. In addition, the Area M supply well also serves as a source of water for dust control along the haul road that connects the Cajon Creek Quarry with Vulcan's processing plant located on Highland Avenue

plant to the southwest. Vulcan currently maintains a Development Permit (DP 97-24) issued by the City, which allows for construction and operation of a new processing plant in Area M. The permitted Area M plant will eventually replace the Highland Avenue plant once mining and reclamation at that site is complete. Once construction of the Area M plant is complete and operations have commenced, the haul road between the two sites will no longer be used, and therefore will not require active dust suppression.

With respect to the existing Project setting, in addition to the quantity of water used annually for dust control and irrigation from the Area M well, water for aggregates processing and non-potable office use at the Highland Avenue plant is served by the Muscoy Mutual Water Company (MMWC). Once the permitted Area M aggregate plant is built and becomes operational, a new well drawing from the Bunker Hill Subbasin will replace the water from MMWC. While not part of this Project, the water uses for the Cajon Creek Area M plant was previously analyzed as part of that project, specifically within the 1991 EIR (SCH No. 90020908).

2.2 Regulatory Content

Under the California Water Code statute as revised, and in addition to all the previously existing requirements for WSAs, if the proposed Project's water supply includes groundwater, the assessment of the water supply must also include the following as part of its informational content: a description of the groundwater basin(s) that will supply the project; for court- or SWRCB-adjudicated basins, a copy of the order or decree determining legal pumping rights; and, for unadjudicated basins designated as high- or medium-priority pursuant to the Sustainable Groundwater Management Act (SGMA), whether the California Department of Water Resources (DWR) has identified the basin as being subject to critical conditions of overdraft and whether a groundwater sustainability agency (GSA) has adopted a Groundwater Sustainability Plan (GSP) or approved alternative, and, if so, a copy of the same (Water Code, § 10910(f)(2)(A)-(C)). For unadjudicated basins designated low- or very low-priority pursuant to SGMA, the WSA must also now describe the basin(s), but the preexisting substantive content requirements for WSAs with respect to such basins otherwise remain the same.

The California Water Code Section 10912(a) requires preparation of a WSA if a proposed project meets any of the following criteria:

1) A proposed residential development of more than 500 dwelling units;
2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
4) A proposed hotel or motel, or both, having more than 500 rooms;
5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;
6) A mixed-use project that includes one or more of the projects defined above; or
7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.

The Project does not include any residential development, will not employ more than 1,000 persons, does

not include any structures with more than 500,000 square feet of floor space, and does not include any hotel or motel structure. Given that the Project involves mining and exceeds the size threshold for industrial projects under criteria, it constitutes a "project" within the meaning of Water Code § 10912(a)(5), and thus requires preparation of a WSA.

As applied under the CEQA, this WSA provides the relevant information needed to determine the potential significance of the environmental effects related to water resources. More specifically, when considering the Project's potential impact to groundwater, the following criteria are of relevance:

1) As planned, is there sufficient supply available to serve the project and reasonably foreseeable future development during normal, single dry, and multiple dry years?
2) Would the Project have an adverse effect on existing uses of groundwater, such as nearby supply wells?
3) If implemented, would the Project substantially deplete groundwater supplies or interfere with recharge such that sustainable groundwater management of a basin would be negatively impacted?
4) Would the Project conflict with or impede the implementation of a water quality control plan or sustainable groundwater management plan?

(Water Code, § 10910(c)(3); CEQA Guidelines, Appendix G.)

To address each of these criteria, the discussion that follows provides the technical background and basis for evaluating the Project's potential impacts with respect to groundwater resources.

3.0 EXISTING SETTING

3.1 Physiography

The Project site is situated in northwestern San Bernardino Valley near the base of the San Bernardino Mountains. The San Bernardino Valley is comprised of a series of coalesced alluvial fans that initiate from the San Gabriel Mountains to the northwest and the San Bernardino Mountains to the northeast. These alluvial fans developed where the Santa Ana River, Mill, Lytle, Cajon, Devil Canyon, East Twin, and City Creeks leave the mountains and combine, resulting in a broad alluvial plain that forms the central part of the San Bernardino Valley (Dutcher & Garrett, 1963).

The Project site is in an area of low topographic relief and adjacent to the active Cajon Creek flood plain. The Cajon Creek is an alluvial channel, which is dry except during periods of significant rainfall or heavy runoff. The active channel areas have sparse vegetation that are characterized by sand and gravel exposed at ground surface. Channel margins are slightly higher and underlain similar deposits of recent sand and gravel (Woodward-Clyde, 1991). Based on Google Earth™ imagery, elevations at the site range from approximately 1,660 to 1,500 feet above mean sea level (amsl).

3.2 Climate

The climate is semiarid and characterized by warm, dry summers, mild winters, intermittent rainfall and comfortable humidities. The mean daily temperatures range from 39°F in the winter to 94°F in the summer (Weather Service, 2022). The majority (greater than 70%) of the annual precipitation occurs from December through March. The Upper Santa Ana River Watershed Region area has experienced wet-dry

cycles that can last 30 years with a prolonged drought period from 1945 to 1964, a prolonged wet period from 1976 to 1984, and a drought period from 1999 to the present (IRUWMP, 2020) Table 1 below was generated from the California Irrigation Management Information System (CIMIS) website using the data from the Highland Station No. 251. Monthly average data for Temperature (F°), Precipitation (in.), and Standard ETo (in.) were derived from January 2017 through March 2022.

Table 1. Climate Data adapted from Highland Station ID 251.

Month	Average Temperature (F°)	Average Precipitation (in.)	Average Standard ETo (in.)
January	54.0	2.30	2.28
February	54.4	1.83	2.89
March	58.5	1.93	4.29
April	64.5	1.32	5.54
May	67.0	0.69	5.99
June	74.7	0.32	7.21
July	80.0	0.69	8.10
August	80.1	0.53	7.44
September	77.0	0.34	5.77
October	69.2	0.45	4.42
November	61.5	1.06	2.91
December	53.6	2.09	2.10
Total	794.5	**13.53**	**58.93**

Source: (CIMIS, 2022)

3.3 Regional and Site-Specific Geology

The Project site is located within the Newmark Federal Superfund site, and consequently there is a significant record of geologic and hydrologic information describing both the geologic framework and the regional groundwater setting . Much of the discussion that follows is sourced from this prior work, as well as the Sespe's 2022 hydrogeologic investigation conducted for the Project, the prior WSA prepared by (Haley & Alrich, 2020) for the Area Q Quarry project, and related technical studies.

The Project site is situated on a broad alluvial fan that extends southeast from the base of the San Bernardino Mountains and is underlain by channel alluvium, alluvial fan deposits, and older wash deposits. The subsurface of the Project site contains primarily alluvial deposits of varying ages and thicknesses, which correspond to different flood events during large rainstorms. Based on boring logs associated with exploratory drilling on the Project site, individual sand and gravel deposits underlying the site consist mainly of similar lithologies, suggesting a common provenance (TerraMins, Inc., 2004).

The 2001 USGS Geologic Map of the San Bernardino North 7.5-Minute Quadrangle, San Bernardino County California by (Miller & Matti, 2001) shown in Figure 3, illustrates the site geology within the context of the regional geology. The site-specific geology consists of three distinct alluvial lithofacies, late Holocene upper terrace sand and gravel deposits, which seem to display a southeast trending depositional dip. Older, slightly dissected, and weakly consolidated to cemented Holocene and late Pleistocene age alluvial deposits are mapped within the mine boundary. This lithofacies is characterized by angular to subangular silt, sand, and pebbles. The apparent depositional dip is like that of the younger upper terrace deposits.

To the west of these lithofacies very young surficial deposits are mapped, which present a geometry generally consistent with an active channel braid of Cajon Creek wash. This unit consists of unconsolidated to locally cemented sand, gravel, and boulder deposits, that typically show fresh flood scour and channel-and-bar geometries. Together with other Quaternary units, these alluvial deposits form a valley-fill succession that can exceed over 800 feet in thickness (Danskin et al., 2006). These alluvial deposits overly crystalline bedrock, which are comprised of igneous and metamorphic rocks (Dutcher & Garrett, 1963).

The Project site is in a complex structural zone near the convergence of the San Jacinto and San Andreas faults. The San Andreas fault zone is the dominant structural element in California. However, roughly one-third of the overall slip found on the San Andreas fault zone in northern and central California is transferred to the San Jacinto fault in southern California. Slip is transferred across this zone of convergence from the San Andreas fault to the San Jacinto fault along a series of an echelon, or stepping, faults (Woodward-Clyde, 1991). The dissected scarp of the San Andreas Fault rises above the valley edge to elevations ranging from about 2,700 feet at the mouth of Cajon Creek to more than 5,500 feet at the mouth of the Santa Ana River canyon. Ridges associated with the San Jacinto Fault are some of the major structural features in southern California. In addition, several other faults conjugate or subparallel to the San Andreas and San Jacinto Faults have been mapped within the basin, including the Glen Helen Fault (GHF) and related splay, which extend across the western part of the Project site (Sespe Consulting, 2021; Dutcher & Garrett, 1963).

The segment of the GHF in the mining area is described as a dextral, strike-slip fault that is mapped as concealed in the Project area (Morton and Miller, 2006). Additionally, close to the top of the access ramp into Area M, is an un-named fault splay associated with the GHF. These two geologic features, as well as other faults in the area act as hydraulic barriers, thus controlling groundwater depth and flow in the immediate Project vicinity (Danskin et al., 2006; URS, 1993). For context, Figure 4 shows the mapped faults that act as hydraulic barriers to groundwater flow.

The alluvial basin fill that is crosscut by the structural shear zone serves as the primary aquifer, with most of the San Bernardino Valley groundwater production wells completed within this depositional system. While nominal by comparison, there is also a small quantity of groundwater found in, or moving through as fracture flow, within the crystalline rocks surrounding and underlying the valley fill is considered negligible (Danskin et al., 2006).

3.4 Area Hydrogeology and Groundwater Basins

The Project site is situated in a portion of the SBBA. The SBBA combines with several other subbasins to form the Upper Santa Ana River (SAR) Watershed, refer to Figure 5. The Upper SAR Watershed covers 852 square miles, makes up about 32% of the total SAR watershed and is predominately located in San Bernardino and Riverside Counties. Total population in the Region is estimated at just over 1 million people and is predicted to grow to over 1.25 million people by 2045 (IRUWMP, 2020). The SBBA has been widely studied over the last 30 years with respect to its capacity to serve beneficial uses, meet demand and projected growth, and as part of the Federal Newmark Superfund Site clean-up action. Therefore, there are a substantial number of studies and groundwater monitoring data throughout this part of the basin, which is used in support of the analyses presented herein.

The SBBA lies between the San Andreas and San Jacinto faults and has a surface area of approximately 141 square miles. The basin is bordered on the northeast by the San Bernardino Mountains and the San

Andreas fault zone; northwest by the San Gabriel Mountains and Cucamonga fault zone; on the east by the Banning fault and Crafton Hills; and to the south by a low, east-facing escarpment of the San Jacinto fault and the San Timoteo Badlands (IRUWMP, 2020).

As previously described, the Lytle Creek subbasin is part of the SBBA, and it is not identified as a separate sub-basin in DWR Bulletin 118-2003; however, the subbasin is an integral part of the Upper Santa Ana Valley Groundwater Basin and acts as a major recharge area for both the Bunker Hill and Rialto-Colton subbasins. In the 2020 Haley & Aldrich WSA prepared for the Area Q Quarry project, the Bunker Hill groundwater basin is identified as the Project site's groundwater supply basin. Notwithstanding the varying names of the underlying groundwater basins, for the purposes of this WSA, the Bunker Hill and Lytle Creek basins are considered as geologically discrete groundwater basins that are managed together as a single basin referred to as SBBA.

Natural Barriers, including faults and stratigraphy influence the groundwater movement between the groundwater subbasins (Woodward-Clyde, 1991). Some the more prominent barriers are the basis for dividing basins into subbasins, while other minor barriers are present that further divide the subbasins into compartments (Woodward-Clyde, 1991). The primary distinguishing characteristics between the two subbasins are the presence of the three separate water-bearing zones and intervening confining zones found in the Bunker Hill subbasin are not observed in the Lytle subbasin (RUWMP, 2017).

With respects to aquifer characteristics, sediments within the Bunker Hill and Lytle subbasins are, in general, highly permeable, and have a high specific yield (Rollins, 1934). Basins with high permeability and specific yield tend to result in an aquifer that responds rapidly to changes in inflow (precipitation and streamflow) and outflow (groundwater pumping, streamflow, and subsurface outflow) (IRUWMP, 2020). Furthermore, as identified in prior studies (Dutcher & Garrett, 1963), and consistent with Sespe's (2021) hydrogeologic investigation, the Bunker Hill and Lytle Creek subbasins are hydraulically separated by faulting. As such, the Area M groundwater supply well is drawing from the aquifer occurring within the boundary of the Lytle Creek subbasin.

In 2019, SBVMWD completed a study to determine the total amount of usable groundwater storage in the SBBA. This is a theoretical maximum volume of groundwater that can be stored from the bottom elevation of the aquifer to the maximum water level in the basin. The SBVMWD calculates the change in groundwater storage by measuring the volume of water lost or gained as compared to a base year, specifically 1934, as shown on Figure 6. The estimated total usable storage for the entire SBBA is 5.69 million acre-feet.

In the case of the municipal water supply serving the Highland Avenue processing plant, the wells associated with the MMWC source groundwater from the Bunker Hill groundwater basin. Based on MMWC water bills, on average the Highland Avenue plant uses approximately 139 acre-feet of water annually for aggregates processing and other non-potable purposes.

3.5 Groundwater Management Framework

The California Water Code requires urban water suppliers within the state to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of the Water Resources (DWR). The UWMPs are required to be filed every five years and must satisfy the requirements of the Urban Water Planning (UWMP) Act of 1983. The DWR allows water purveyors to collaborate in developing a regional UWMP.

The Project is located within the groundwater basin boundaries of the SBBA and is managed by the San Bernardino Valley Water District (SBVWD). The framework for basin management within the SBBA is provided by a 1969 groundwater adjudication called the "Western Judgment". San Bernardino Valley was a named party in that Western Judgment on behalf of agencies and overlying groundwater rights users within its boundaries. A copy of the Western Judgment is attached as Exhibit A.

Under the Western Judgment, all instructions and orders of the Court are enforced by a watermaster, comprised of one representative from the San Bernardino Valley Water District and another from Western Municipal Water District (Western-San Bernardino Watermaster). The Western-San Bernardino Watermaster was directed to prepare initial reports between 1969-1971 on determinations required by the Western Judgment, including the safe yield of the basin. Beginning in 1972, the Watermaster began its required annual accounting of the ground and surface water production within the areas subject to the Western Judgment (see Figure 7).

The Western-San Bernardino Watermaster calculated the natural safe yield of the SBBA as 232,100 acre-feet per year for all extractions, including surface water diversions and groundwater pumping. Surface water is diverted from Mill Creek, Lytle Creek, and the Santa Ana River (SAR). Within San Bernardino Valley's boundaries, the adjusted right for the SBBA is 167,238 acre-feet per year which equates to 72.05 percent of safe yield, with the remainder of the water rights assigned to plaintiff agencies outside of its service area. Agencies and overlying owners within SBVWD's boundaries are allowed to extract more than 167,268 acre-feet per year from the SBBA, however, SBVWD is required to import and recharge a like amount supplemental water into the basin to offset those excess extractions.

All extractions from the SBBA are tabulated by a Court-appointed Watermaster who prepares an annual report tracking each party's compliance with the Western Judgment. As evidenced by Table 2 of the Annual Report of the Western-San Bernardino Watermaster for Calendar Year 2021, total extractions within the San Bernardino Basin Area have consistently remained below the Safe Yield since 2009 (Watermaster, 2021). As of the accounting performed for the 2020 Annual Western-San Bernardino Watermaster Report, groundwater users overlying the SBBA (referred to in the judgment as "Non-Plaintiffs") have 463,168 AF of net credit accumulated in the SBBA and are, therefore, not required to recharge. Although there is no recharge requirement under the Judgment, the Non-Plaintiffs have continued to recharge the SBBA.

Vulcan has been using groundwater from the Lytle Creek basin within the SBBA since the Area M well was installed in late 1998, and before that from a prior well near the main plant on Highland Avenue. Because Vulcan's past and future use of groundwater is consistent with the Western Judgement (refer to Section 5.0 below), the Project would not create any conflict with management of the SBBA.

4.0 PROJECT HYDROGEOLOGY

As stated earlier, the Project site is situated in a section of the Bunker Hill and Lytle Creek groundwater subbasins which make up the SBBA. These basins are defined principally by the hydrogeologic discontinuities discussed in Section 3.3, most notably the GHF, which serves as the southwest basin boundary for the Bunker Hill Groundwater Basin (refer to Figure 4). In relation to the Project site, except for a portion of the southwest corner of Area M along the existing pit wall and part of Area N, all mining areas are situated east of mapped GHF and fault splay segments.

Within the Lytle Creek Groundwater subbasin, the fault splay bisects this basin and has been determined

to restrict water movement. Dutcher and Garrett (1963) attributed depth to groundwater up to 100 feet difference across this barrier, with elevations being lower on the Bunker Hill (east) subbasin side of this fault. For further detail regarding the hydrogeologic conditions within the Project area, and notably the hydraulic characteristics of the aquifer in relation to the mining plan, please refer to the hydrogeologic investigation prepared by Sespe (2021).

The Area M well is underlain by and therefore producing water from the Lytle Creek subbasin. The Lytle Creek subbasin is characterized by unconsolidated alluvium and sedimentary strata, which overly older crystalline bedrock (Dutcher & Garrett, 1963). The unconsolidated alluvial deposits constitute the primary reservoir for storing large quantities of water. According to Danskin et al. (2006), certain stratigraphic intervals exhibit a high specific yield, particularly in zones where the alluvium is dominated by well sorted sands and gravels.

5.0 CONSUMPTIVE USE OF GROUNDWATER

Under the Western Judgment, the groundwater production rights of overlying owners and individual agencies within San Bernardino Valley's service area were not allocated, meaning that extractions by overlying owners and individual agencies are not subject to specific volumetric limits. Instead, the Western Judgment provides a physical solution that ensures that the plaintiffs, water users in Riverside who developed rights to export water from the SBBA, obtain their allotment while permitting overlying owners and individual agencies in the SBBA to increase their extractions over time. Under the Judgment, overlying owners and individual agencies report their annual water usage to the Western-San Bernardino Watermaster. If extractions from overlying owners and individual agencies within the SBBA exceed the portion of the Safe Yield that was allocated to those within the SBBA, then San Bernardino Valley is required to import water into the basin to offset that exceedance. As a result, overlying owners and individual agencies within San Bernardino Valley's boundaries can extract water from the basin for beneficial use so long as San Bernardino Valley is meeting its obligations under the Western Judgment.

Under the Western Judgment, overlying owners and individual agencies within San Bernardino Valley were allocated the right to extract a total of 167,238 acre-feet per year from the SBBA. Unutilized portions of that allotment are available as a future "credit" against the obligation to import water when extractions within San Bernardino Valley exceed 167,238 acre-feet per year. As defined, the SBBA includes both the Bunker Hill Groundwater Basin and the Lytle Creek subbasin. As discussed in Section 3.5, above, total extractions by overlying owners and individual agencies within San Bernardino Valley have consistently remained below the Safe Yield since 2009. As of the accounting performed for the 2021 Annual Western-San Bernardino Watermaster Report, groundwater users within San Bernardino Valley (referred to in the judgment as "Non-Plaintiffs") have 490,620 AF of net credit accumulated in the SBBA and are, therefore, not required to recharge. Although there is no recharge requirement under the Judgment, the Non-Plaintiffs have continued to recharge the SBBA. Therefore, San Bernardino Valley is currently far ahead of its obligations under the Western Judgment, meaning that overlying owners and individual agencies within the basin can continue to extract water from the SBBA under the terms of the Western Judgment.

Vulcan has been extracting groundwater from the SBBA under its overlying right since the Area M well was put into operation in late 1998, and before that from a prior well near the Highland Avenue plant. The Area M groundwater well was installed under Permit Number 09049701 from San Bernardino County. As described above, overall extractions within the SBBA by individuals and agencies located within San Bernardino Valley's service area have consistently remained lower than the available Safe Yield from the Western Judgment. Furthermore, the Upper Santa Ana River Watershed Regional Urban Water

Management Plan (IRUWMP) anticipates that, should extractions from the SBBA exceed the Safe Yield in future years, sufficient surface water supplies will be available to recharge the basin, consistent with the Western Judgment. Accordingly, there is sufficient water available in the SBBA for Vulcan to continue exercising its overlying groundwater use pursuant to the terms of the Western Judgment.

6.0 SOURCE AND CERTAINTY OF WATER SUPPLY

For the Project, groundwater within the Lytle Creek subbasin would serve as the source for water supply. While the Bunker Hill basin subbasin will supply water to the permitted Area M aggregates plant once it is constructed, the Project will not utilize this source as an assured water supply for Project activities.

As previously described, both basins are characterized by alluvial aquifers, which are bounded by faults that act, in part, as hydraulic barriers to groundwater flow. Percolating flood waters from Lytle and Cajon creeks constitute the primary conventional supply of groundwater to the basins (Rollins, 1934). Water for the Project will be sourced from the existing Area M supply well, which draws groundwater from the Lytle Creek subbasin, managed by regulatory agencies as the SBBA. The Area M supply well was drilled in December 1997, to a depth of 416 feet below ground surface (bgs). The borehole diameter is 26 inches with an internal steel casing diameter of 15.375 inches. The 0.08-inch slotted screen interval was installed from 220 to 360 feet bgs. At the time of installation, the static water level was 155 bgs, and the 26.5-hour pump test yielded 14 feet of drawdown (Haley & Alrich, 2020).

The Area M water supply well can pump up to 1,450 gallons per minute and based on the Haley & Aldrich 2020 WSA, produces on average 141 acre-feet per year. Of that, Haley & Aldrich (2020) determined a consumptive use of 19.5 acre-feet per year in support of ongoing and future mining operations (Area L and Area Q). Table 3 below was adapted from the Haley & Aldrich 2020 WSA and displays the Area M water supply well's historical production volumes.

In addition to the Area M supply well, to support the already permitted, future Area M processing plant (which is not part of the Project), a new approved water supply well will be installed in Area L or Area Q once the Highland Avenue plant is decommissioned and no longer served by the MMWC. In either locality the new well location will source groundwater from the Bunker Hill groundwater subbasin (part of the SBBA), which is the same basin that is the source of water for the MMWC production wells. Therefore, the source of the water for the Area M aggregates plant will remain unchanged.

As shown below in Table 2, the IRUWMP projects sufficient water supply will be greater than regional demand between 2025 and 2045, including single dry and multiple dry years. These excessive supply values have accounted for a 10 to 15 percent buffer above anticipated regional demand**.**

When analyzed separately from the total regional supplies (i.e., not including surface water, recycled water, and imported water), the IRUWMP projects that the SBBA may have potential extractions above the adjusted basin safe yield 232,100 acre-feet per year between 2025 and 2045 (IRUWMP, 2020). After accounting for return flows from over-extraction volumes, return flows from imported water deliveries, and direct deliveries, the IRUWMP projects a required imported water volume of between 47,072 and 58,779 between 2025 and 2045 (IRUWMP, 2020). The San Bernardino Valley Municipal Water District (Valley District) manages the groundwater basin outflows and imports water from the State Water Project (SWP) for basin recharge, as necessary. Based on the excess overall supply as documented in the SBVRUWMP (and reproduced in Table 2), the Valley District will be able obtain additional sources beyond the SWP water for basin recharge to maintain a certainty of supply.

Table 2. 2020 IRUWMP Regional Water Supply and Demand Projections

Water Year Type	Project Totals	2025	2030	2035	2040	2045
Normal Year	Total Supplies	459,798	473,745	486,396	519,261	522,609
	Total Demands	332,053	342,420	353,212	363,023	373,374
	Total Supply Target	381,861	393,783	406,194	417,477	429,380
	Difference	77,937	79,962	80,202	101,784	93,229
Wet Year	Total Supplies	554,018	570,535	598,305	644,428	647,777
	Total Demands	332,053	342,420	353,212	363,023	373,374
	Total Supply Target	381,861	393,783	406,194	417,477	429,380
	Difference	172,157	176,752	192,111	226,951	218,397
Single Dry Year	Total Supplies	425,543	438,658	453,694	497,487	510,581
	Total Demands	365,258	376,662	388,533	399,326	410,712
	Total Supply Target	420,047	433,161	446,813	459,224	472,318
	Difference	5,496	5,497	6,881	38,263	38,263
5-Year Drought	Total Supplies	430,952	444,237	461,089	506,316	519,410
	Total Demands	365,258	376,662	388,533	399,326	410,712
	Total Supply Target	420,047	433,161	446,813	459,224	472,318
	Difference	10,905	11,076	14,276	47,092	47,092
30-Year Drought	Total Supplies	442,183	455,358	464,194	478,937	482,286
	Total Demands	332,053	342,420	353,212	363,023	373,374
	Total Supply Target	381,861	393,783	406,194	417,477	429,380
	Difference	60,322	61,575	58,000	61,460	52,906

7.0 WATER DEMAND

The Project would continue to extract materials at the same rate as the existing operations, which is an average of 1.9 to 2.6 MT per year with a maximum of 3.1 MT per year. As such, since the rate of extraction would be the same, the annual water demand for dust control and irrigation would be expected to remain the same. Thus, the Project would not create a new significant demand on groundwater resources in the SBBA. Moreover, with the new Area M processing plant replacing the Highland Avenue plant, material movement would no longer occur using the existing haul road connecting the Cajon Creek Quarry to the Highland Avenue plant. Therefore, although not part of the Project, the water demand associated with road dust control would be reduced, resulting in less overall demand on the aquifer in the SBBA compared to existing conditions.

The water demand previously established for the Area Q Quarry, which is based on the average annual demand associated with material extraction in the current mining area (Area L), was determined by Haley & Aldrich (2020) as part of their WSA for the Area Q Quarry project. Based on production data for the Area M well (refer to Table 3 below), Haley & Aldrich (2020) calculated an average annual demand of 19.5 acre-feet. Thus, given that the usage would remain the same, the Project water demand would remain 19.5 acre-feet annually.

This annual demand equates to 1,072.5 acre-feet over the 55-year life of the Project. This Project demand ties directly to the planned consumptive uses, which is principally for dust control during mining and transport of the harvested materials to the plant site, and for periodic irrigation as needed to support revegetation as part of site reclamation.

Table 3. Vulcan Historical Area M Well Production and Area L Groundwater Usage[1]

Year	Area M Well Production [2, 3] (Acre-Feet)	Area L & Q Mine Pit Usage [4] (Acre-Feet)	Normal/Wet/Dry Year [5]
1999	138	20.7	Dry
2000	140	21	Dry
2001	130	19.5	Normal
2002	140	21	Dry
2003	197	29.6	Normal
2004	197	29.6	Dry
2005	196	29.4	Wet
2006	196	29.4	Wet
2007	196	29.4	Dry
2008	196	29.4	Dry
2009	196	29.4	Dry
2010	103	15.5	Dry
2011	107	16.1	Wet
2012	92	13.8	Dry
2013	101	15.2	Dry
2014	135	20.3	Dry
2015	105	15.8	Dry
2016	110	16.5	Dry
2017	153	23	Dry
2018	112	17	Dry
2019	108	16	Wet
2020	93	14	Dry
2021[6]	105	15.75	Dry

Notes:
[1] Table was adapted and updated from Table 1, Haley & Aldrich WSA Report, 2020.
[2] Area M supply well production volumes through 2017 from Integrated Resource Management, Inc. document, 2018.
[3] Area M supply well production volumes 2018 through 2020 from Vulcan.
[4] Area L groundwater usage conservatively assume to be 15% of the total Area M well water use (Haley & Aldrich, 2020).
[5] Data to assess whether the calendar year was wet vs. normal vs. dry comes from the California Data Exchange Center (CDEC) website. Monthly Data was assessed from 1905 through 2004 (when the data set ends) from San Bernardino Medical Center Station (SBD). Years with precipitation between the 40th and 60th percentile of this data set (13.4 to 16.4 annual inches) are classified as normal, with year above or below this classified as wet or dry, respectively. For 2005 through 2020, daily data from the San Bernardino County Yard (SCY) was assessed against the standard developed for the SBD data classification.
[6] 2021 was calculated based on actual data provided by Vulcan through July 2021.

8.0 SUFFICIENCY ANALYSIS

In accordance with Govt. Code § 66473.7(a)(2), a sufficient water supply for a project constitutes the total supply of water available during normal, single dry and multiple dry years within a 20-year projected demand period. As previously stated, the Area M groundwater supply well draws from the Lytle Creek basin, as part of the SBBA.

The certainty of supply was evaluated under normal, single dry, and multiple dry years. To understand if the Project's projected consumptive use could be met during normal and dry year periods, Sespe followed the methodology previously applied for the Area Q Quarry water supply assessment, which uses precipitation record data to establish wet and dry water years for the Area M supply well over a 20-year

period of record. Specifically, the 40th and 60th percentile of this data set (13.4 to 16.4 annual inches) were assigned as normal, with those water years above or below as wet or dry, respectively, refer to Table 2.

For this sufficiency analysis, Sespe evaluated the sufficiency supply for a 20-year period extending from 2025 through 2045 by comparing the estimated groundwater supply (see Table 2) against total demand based the Area M well's average annual water production of 19.5 acre-feet (refer to Table 3), which was based on the existing Cajon Creek operations. The 19.5 acre-feet per year results in no change to baseline usage, as mining operations will not increase, thus the water demand will remain unchanged. Based on this analysis, the water supply is sufficient to meet the projected water demand over the life of the Project during normal, single dry and multiple dry years

Additionally, the IRUWMP predicts there will be an excess supply of groundwater regionally available between 2025 to 2045 under normal year, single dry year, and multiple dry years, as reproduced in Table 2. While groundwater demands on the SBBA are projected to exceed the safe yield level between 2025 and 2045 the excess supply in the Valley District will allow for recharge of the SBBA (Haley & Alrich, 2020).

9.0 CONCLUSIONS

Sespe has performed this WSA in support of San Bernardino County's environmental review of the Vulcan Cajon Creek Quarry Consolidated Project. The scope of this assessment provides the pertinent background and analysis required to prepare a CEQA impact determination with respect to the Project's effects on the planned water supply source. Based on the analysis included in this WSA, Sespe provides the following conclusions:

1. The Project would require 19.5 acre-feet of water annually, which would be drawn from the Lytle Creek groundwater subbasin, as part of the greater SBBA, using the existing Area M supply well. This aquifer in the Lytle Creek basin is characterized by high permeability and specific yield. The Area M water supply well is capable of pumping 1,450 gallons per minute and produces on average 125 acre-feet per year (based on data provided by Vulcan). Given there would be no new groundwater demand, the capacity of the Area M well far exceeds the Project's needs.
2. The effect of continued pumping of the existing Area M supply well for would be insignificant, when comparing the aquifer capacity of the SBBA to the Project's water demand. The total estimated storage capacity of the SBBA is approximately 5,976,000 acre-feet. For the life of the Project, the total water demand is 1072.5 acre-feet. The projected water demand provided by the existing Area M groundwater supply well would not have a significant impact as respects to total aquifer yield based on the safe yield determination for the SBBA. Accordingly, there is a sufficient water supply over the duration of the Project, and there would not be a substantial depletion of available groundwater supplies.
3. To determine the certainty of water supply for the Project, a sufficiency analysis was performed. The certainty of supply was evaluated under normal, single dry, and multiple dry years. To understand if the Project's projected consumptive use could be met during normal and dry year periods, Sespe followed the methodology previously applied for the Area Q Quarry water supply assessment, which uses precipitation record data to establish wet and dry water years for the Area M supply well over a 20-year period of record. Specifically, the 40th and 60th percentile of this data set (13.4 to 16.4 annual inches) were assigned as normal, with those water years above or below as wet or dry, respectively. Based on this analysis, the water supply is sufficient to meet the projected water demand over the life of the Project during normal, single dry and multiple

dry years. Accordingly, groundwater in the SBBA is sufficient to provide an assured water supply for the Project's forecasted demand under normal and dry year conditions, as well as consecutive dry years.

4. The source of water for the Project is groundwater within the Lytle Creek subbasin, which is part of the SBBA. Groundwater in the SBBA is managed through the Upper Santa Ana Watershed IRUWMP. This plan predicts there will be an excess supply of groundwater regionally available between 2025 to 2045 under normal year, single dry year, and multiple dry years. Vulcan has been using groundwater from the Lytle Creek subbasin within the greater SBBA since the Area M well was installed in late 1998, and before that from a well formerly located near the main plant on Highland Avenue. Given that Vulcan's past and future use of groundwater is not subject to adjudicated limits, or included within the framework of the current IRUWMP, the Project would not create any conflict with management of the SBBA.

10.0 REFERENCES

CIMIS. (2022, March 22). *California Irrigation Management Network Information System*. Retrieved from California Department of Water Reources: https://cimis.water.ca.gov/Stations.aspx

Danskin, W. R., McPherson, K. R., & Woolfenden, L. R. (2006). Hydrology, Description of Computer Models, and Evaluation of Selected Water-Management Alternatives in the San Bernardino Area, California. *U.S. Geological Survey Open-File Report 2005-1278*, 178.

Dutcher, L. C., & Garrett, A. A. (1963). Geologic and Hydrologic Features of the San Bernardino Area, California, with Special Reference to Underflow Across the San Jacinto Faults. *USGS Water Supply Paper No. 1419*, 114.

DWR. (2003). Guidebook for Implementation of Senate Bill 1610 and Senate Bill 221 of 2001 to assist water suppliers, cities, and counties in integrating water and land use planning. *California Agencies*. Paper 95. Retrieved from Digital Commons: http://digitalcommons.law.ggu.edu/caldocs_agencies/95

Haley & Alrich. (2020). *Water Supply Assessment: Vulcan Materials Company Area Q Project.* San Bernardino: San Bernardino County.

IRUWMP. (2020). *2020 Upper Santa Ana River Watershed Integrated Regional Urban Water Management Plan.* Retrieved from San Bernardino Valley Municipal Water District: https://www.sbvmwd.com/reports/reports/-folder-1120

Miller, F. K., & Matti, J. C. (2001). Geologic Map of the San Bernardino and Santa Ana 30' by 30' quadrangles, California. *USGS Open-File Report 2006-1217*.

Rollins, e. a. (1934). South Coastal Basin Investigation, Geology and Groundwater Storage Capacity of Valley Fill. *USGS Bulletin No 45*.

RUWMP. (2017). *2015 San Bernardino Valley Regional Urban Water Management Plan, 2017 Amendment.* San Bernardino, CA: San Bernardino Valley Municipal Water District.

Sespe Consulting. (2021). *Draft - Hydrologic Investigation: Cajon Creek Consolidated Quarry Project.* Ventura, CA.

TerraMins, Inc. (2004). *Preliminary drilling results for "Area Q", San Bernardino County California.* Muscoy, CA.

URS. (1993). *Remedial Investigation/Feasibility Study Report for Newmark RI/FS Groundwater Contamination Project.* URS Group Inc.

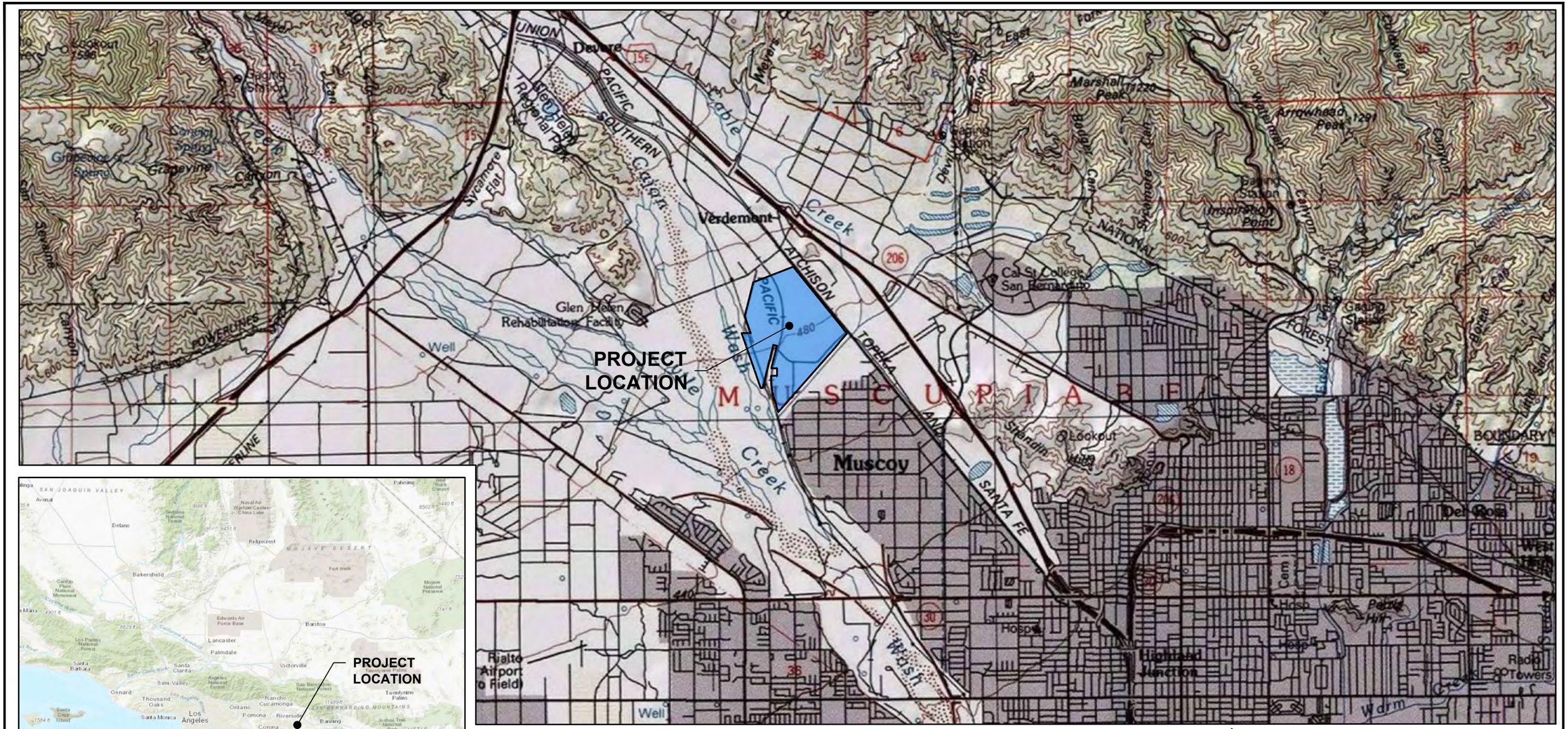
Watermaster. (2021). *Annual Report of the Western - San Bernardino Watermaster.* Retrieved from Western Municipal Water District: https://www.wmwd.com/DocumentCenter/View/5669/FINAL-WSBWM-2021-Annual-Report-20210729?bidId=

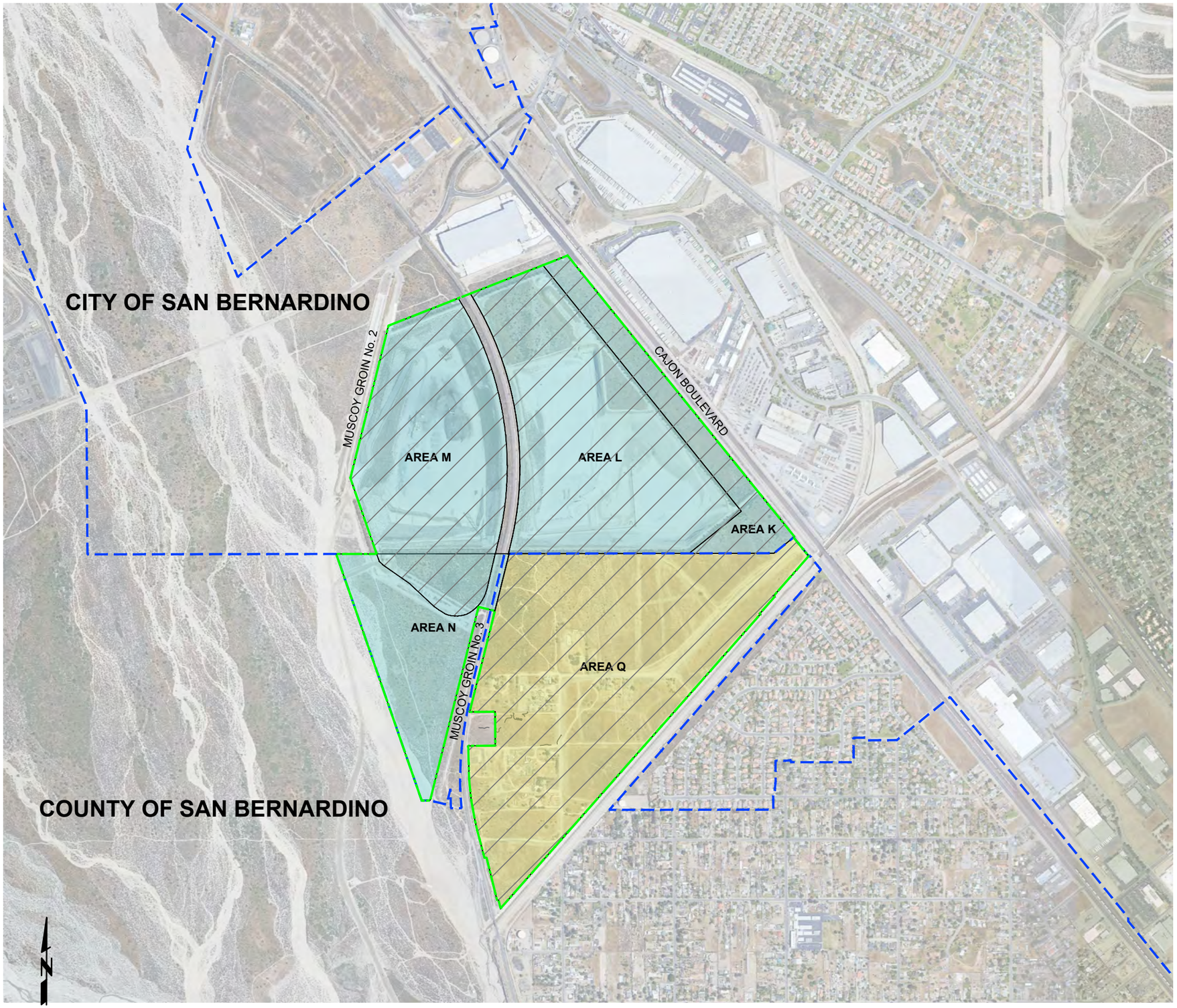
Weather Service. (2022, April 2). *US Climate Data by the National Weather Service*. Retrieved from US Climate Data: https://www.usclimatedata.com/climate/san-bernardino/california/united-states/usca0978

Western Judgment, 78426 Western Municipal Water District er al. v. East San Bernardino Contry Water District (Superior Court of the State of California April 17, 1969).

Woodward-Clyde. (1991). *Draft EIR: Calmat Cajon Creek Specific Plan and Conditional Use Permit/Reclamation Plan. San Bernardino, CA: Calmat Company.* San Bernardino: Woodward-Clyde Consultants.

FIGURES and APPENDICES


PROJECT LOCATION
Devore
Verdemont
Glen Helen Rehabilitation Facility
Muscoy
Creek
Wash
PACIFIC
SOUTHERN
ATCHISON
TOPEKA
SANTA FE
NATIONAL FOREST
Cal St College San Bernardino
Marshall Peak
Arrowhead Peak
Inspiration Point
Lookout
Rialto Airport
Highland Junction
Del Rosa
BOUNDARY
Well
POWERLINE
Sycamore Flat
Grayeying Canyon
Waterman Canyon
Devil Canyon
Boulder Canyon
Meyers
East
Cable
Mill Creek
Warm
Hospital
Radio Towers
Cem
Hosp
Peak Hill
Strandin
Lookout
18
30
35
36
206
480
410
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
5200
5400
5600
5800
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6200
6400
6600
6800
7000
7200
7400
7600
7800
8000
8200
8400
8600
8800
9000
9200



LEGEND

- PROJECT BOUNDARY
- JURISDICTIONAL BOUNDARY
- AREAS IN THE CITY OF SAN BERNARDINO (CAJON CREEK QUARRY)
- AREA IN THE COUNTY OF SAN BERNARDINO (AREA Q QUARRY)
- CONSOLIDATED MINING AREAS

DATUM: HORZ= NAD83, CALIFORNIA ZONE
AERIAL: GOOGLE EARTH, DATED: 03/23/2019

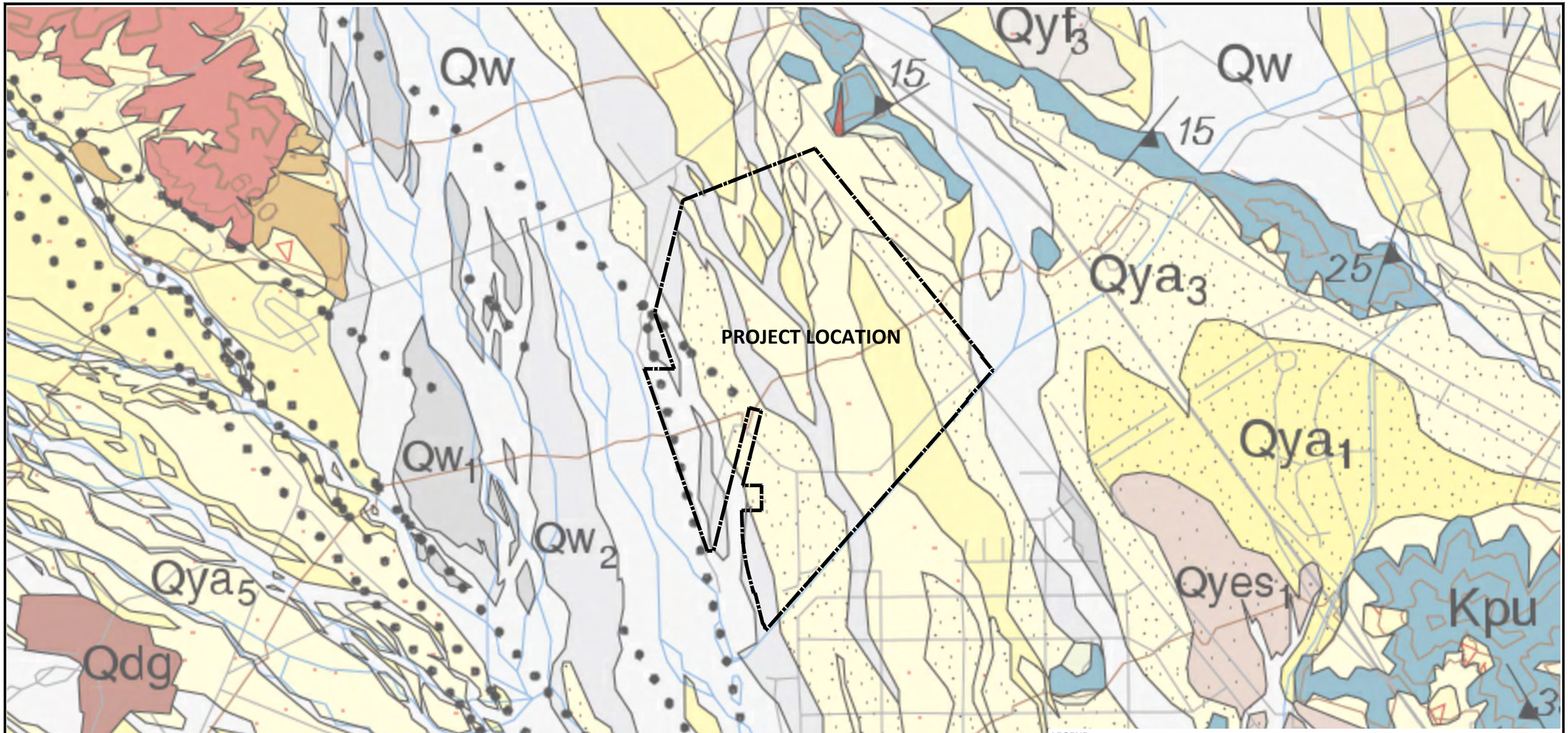
SESPE CONSULTING, INC.
A Trinity Consultants Company.
374 Poli Street, Suite 200 • Ventura, CA 93001
(805) 275-1515 • www.sespeconsulting.com

AREAS WITHIN CITY OR COUNTY OF SAN BERNARDINO
VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA

SCALE: HORIZ AS SHOWN, VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: LLB
DATE: APRIL 2022

FIGURE 2

S:\Vulcan\Cajon Creek Phase II Project\Hydrogeologic Study\Hydrogeologic Report Figures\Figure 2 Extraction Areas\Vulcan-Figure-2_08-24-21.dwg Sep 02, 2021, 3:12pm GJC



LEGEND

- KPU - PELONA SCHIST, UNDIFFERENTIATED (MESOZOIC)
- QYA_1 - YOUNG AXIAL-CHANNEL DEPOSITS, UNIT 1 (EARLY HOLOCENE AND LATE PLEISTOCENE)
- QYA_3 - YOUNG AXIAL-CHANNEL DEPOSITS, UNIT 3 (MIDDLE HOLOCENE)QYA_4- YOUNG AXIAL-CHANNEL DEPOSITS, UNIT 4 (LATE HOLOCENE)$QYES_1$ - YOUNG EOLIAN DEPOSITS (SHEET SAND), UNIT 1 (EARLY HOLOCENE AND LATE PLEISTOCENE)
- QYF_3 - YOUNG ALLUVIAL-FAN DEPOSITS, UNIT 3 (MIDDLE HOLOCENE)
- QW - VERY YOUNG WASH DEPOSITS (LATE HOLOCENE)
- QW_1 - VERY YOUNG WASH DEPOSITS, UNIT 1
- QW_2 - VERY YOUNG WASH DEPOSITS, UNIT 2

— PROJECT BOUNDARY

— FAULT LINE

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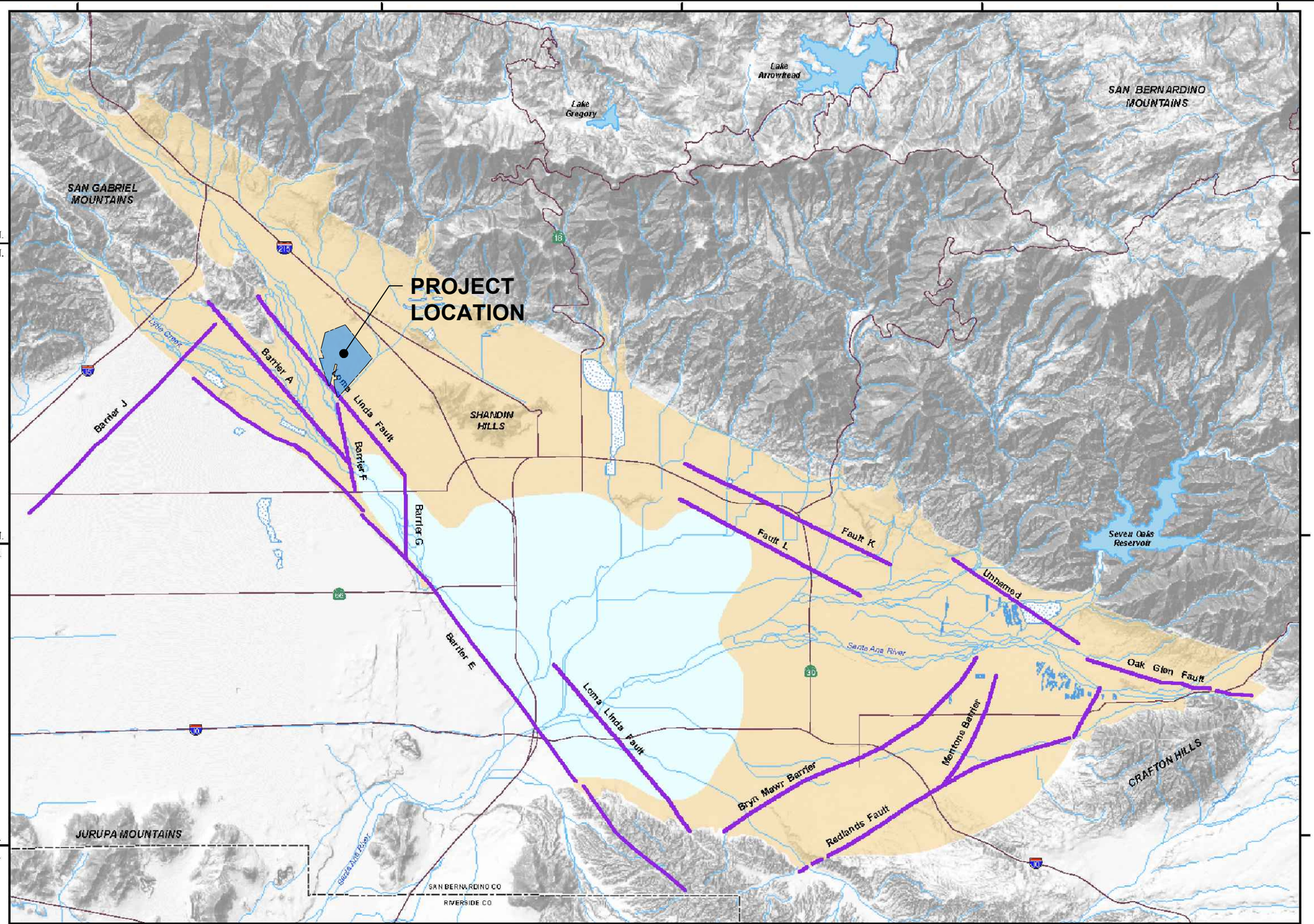
AREA SURFACE GEOLOGY AND FAULT ORIENTATIONS

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA

SCALE: HORIZ. AS SHOWN VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: LLB
FIGURE NUMBER 3
DATE: APRIL 2022

S:\Vulcan\Cajon Creek Phase II Project\Hydrogeologic Study\Hydrogeologic Report Figures\Figure 3 Area Surface Geology\Figure 3. Geologic Map of Project Area.dwg Sep 02, 2021, 3:13pm GJC

LOCATION OF GROUNDWATER FLOW BARRIERS



EXPLANATION

- Groundwater Flow Barrier
- Spreading Grounds or Basins
- San Bernardino Basin Area Groundwater Basin Boundary
- Pressure Zone
- County Boundary

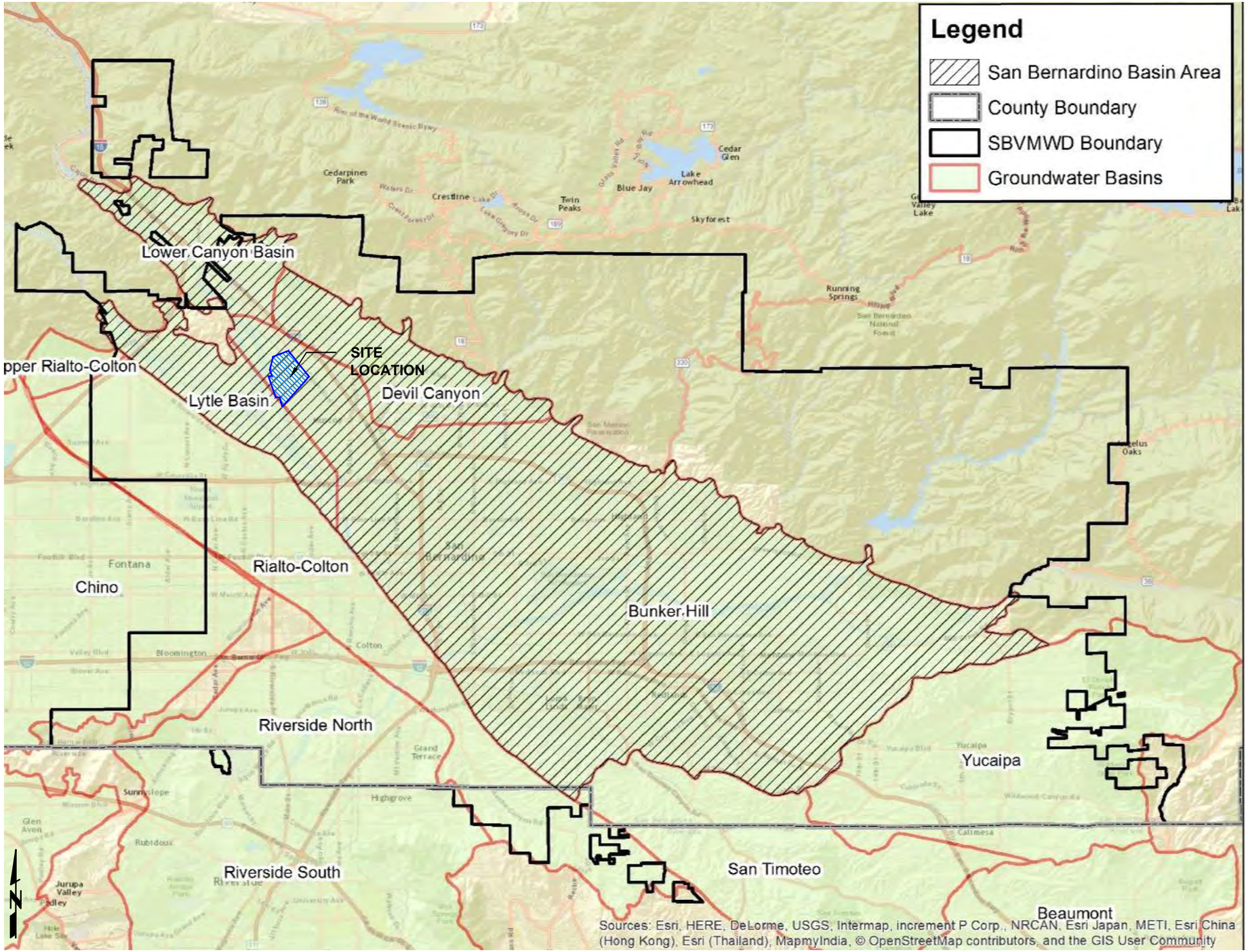
SOURCE: SAN BERNARDINO BASIN AREA REFINED BASIN FLOW MODEL AND SOLUTE TRANSPORT MODEL REPORT, FIGURE 68, LAYER 1, PREPARED 30-SEP-09 FOR SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT BY GEOSCIENCE SUPPORT SERVICES, INC.

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GROUNDWATER BASINS AND HYDRAULIC BARRIERS
VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA

SCALE: HORIZ. AS SHOWN VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: LLB
FIGURE NUMBER 4
DATE: APRIL 2022

S:\Vulcan\Cajon Creek Phase II Project\Hydrogeologic Study\Hydrogeologic Report Figures\Figure 4 Groundwater Basins and Hydraulic Barriers\Figure 4 Groundwater Basins and Hydraulic Barriers.dwg Sep 02, 2021, 3:15pm GJC



N.T.S.

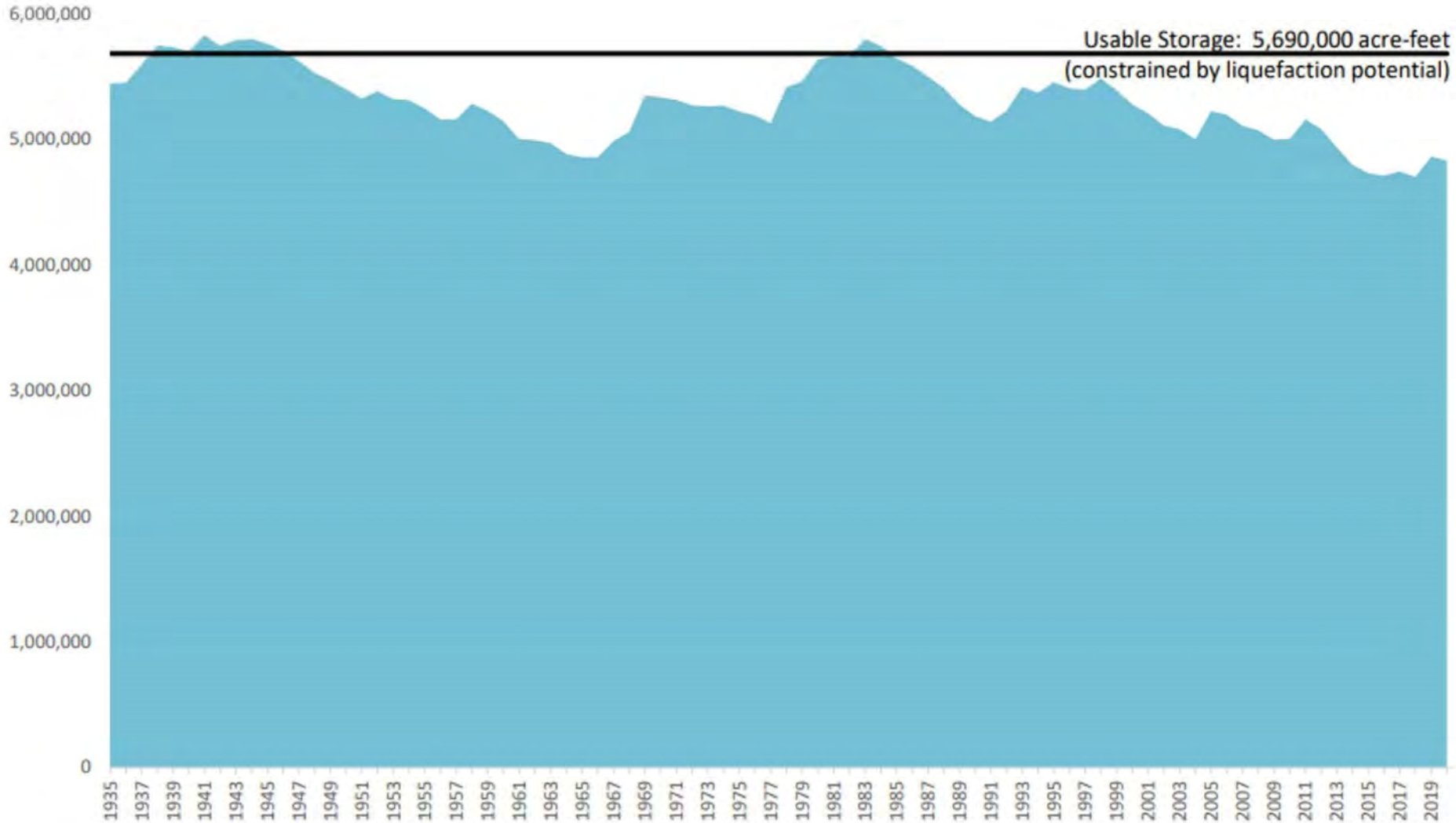
SESPE CONSULTING, INC.
A Trinity Consultants Company
374 Poli Street, Suite 200 • Ventura, CA 93001
(805) 275-1515 • www.sespeconsulting.com

SAN BERNARDNO VALLEY GROUNDWATER BASIN (SBBA)

SCALE: HORIZ. AS SHOWN VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: LB/ BA
DATE: APRIL 2022

FIGURE 5

C:\Users\Guillaume.Camus\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\CAD\2022 Groundwater Basin\Vulcan–CajonCreekPhaseII–Groundwater–Basin_2022–04–19.dwg Apr 19, 2022, 12:05pm Guillaume.Camus



(IRWMP, 2020)

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San Bernardino Basin Change in Storage Results (acre-feet)

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA

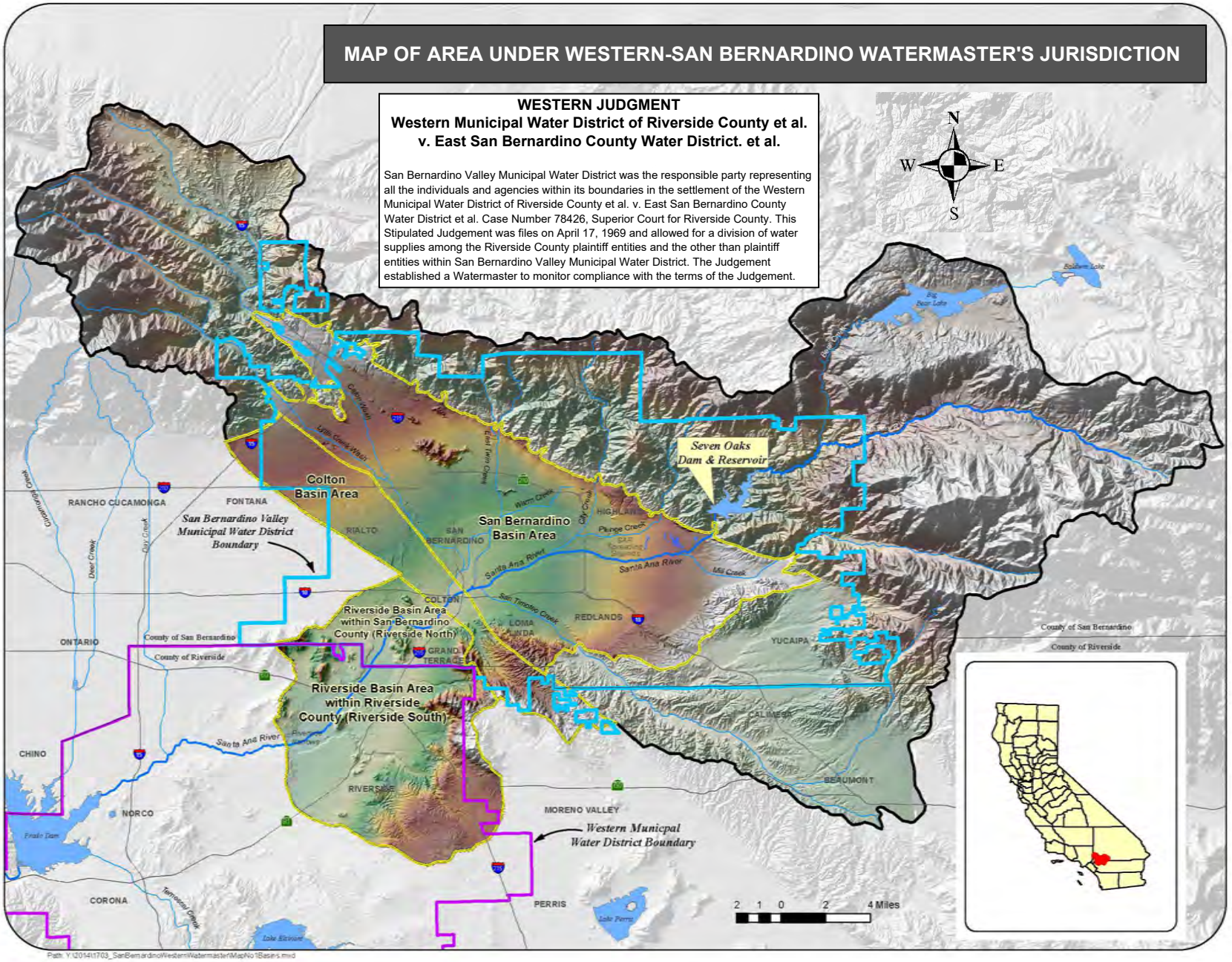
SCALE: HORIZ. AS SHOWN / VERT. AS SHOWN	FIGURE NUMBER 6
DRAWN BY: G. CAMUS	
CHECKED BY: LLB	DATE: APRIL 2022

MAP OF AREA UNDER WESTERN-SAN BERNARDINO WATERMASTER'S JURISDICTION

WESTERN JUDGMENT

Western Municipal Water District of Riverside County et al. v. East San Bernardino County Water District. et al.

San Bernardino Valley Municipal Water District was the responsible party representing all the individuals and agencies within its boundaries in the settlement of the Western Municipal Water District of Riverside County et al. v. East San Bernardino County Water District et al. Case Number 78426, Superior Court for Riverside County. This Stipulated Judgement was files on April 17, 1969 and allowed for a division of water supplies among the Riverside County plaintiff entities and the other than plaintiff entities within San Bernardino Valley Municipal Water District. The Judgement established a Watermaster to monitor compliance with the terms of the Judgement.



(Watermaster, 2021)

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VULCAN MATERIALS COMPANY
CAJON CREEK QUARRY

SCALE: HORIZ. AS SHOWN VERT. AS SHOWN	FIGURE NUMBER 7
DRAWN BY: G.CAMUS	
CHECKED BY: APS	DATE: OCTOBER 2022

APPENDIX A

WESTERN JUDGEMENT

FILED
RIVERSIDE COUNTY

APR 17 1969

DONALD O. SULLIVAN, Clerk
By _____ Deputy

CLAYSON, STARK, ROTHROCK & MANN
ATTORNEYS AT LAW
LAW BUILDING
601 SOUTH MAIN STREET
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CORONA, CALIFORNIA 91720
737-1910
689-7241

SUPERIOR COURT OF THE STATE OF CALIFORNIA

FOR THE COUNTY OF RIVERSIDE

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY, et al., Plaintiff, v. EAST SAN BERNARDINO COUNTY WATER DISTRICT, et al., Defendants.	No. 78424 (74726) 4/17/69 STIPULATION FOR JUDGMENT

The undersigned, as counsel for the indicated parties in the above-entitled action, hereby stipulate and agree as follows:

(1) That judgment, substantially in the form attached hereto as Exhibit "A", may be entered by the Court herein.

(2) That the limitation periods specified in Sections 581 and 583 of the Code of Civil Procedure are by this stipulation extended to and including the date hereof.

(3) Each party to this stipulation expressly

waives findings of fact and conclusions of law in support of the Judgment, and specifically waives any right to appeal therefrom; provided that nothing herein contained shall be deemed to restrict or impair the rights of any parties in relation to any proceeding which may hereafter be undertaken in connection with the exercise of the Court's reserved jurisdiction or determinations of the Watermaster.

Dated: April 17, 1969.

SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT

By Joseph E. Brockman
President

and _____
Secretary

Approved Martin McDonough
Attorney

BEST, BEST & KRIEGER

By Arthur L. Littlewortth
for Western Municipal Water District of Riverside County

JOHN WOODHEAD, City Attorney
LELAND J. THOMPSON, JR.

By _____
for City of Riverside, for itself and as successor in interest to Gage Canal Company

CLAYSON, STARK, ROTHROCK & MANN

By _____
for Agua Mansa Water Company and Meeks & Daley Water Company

REDWINE & SHERRILL

By _____
for Riverside Highland Water Company

THOMAS J. CUNNINGHAM
JOHN P. SPARROW
ROBERT C. FIELD

By John P. Sparrow
for The Regents of the University of California

JUDGMENT

FILED
RIVERSIDE COUNTY

APR 17 1969

DONALD D. SULLIVAN, Clerk
By _____ Deputy

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA

IN AND FOR THE COUNTY OF RIVERSIDE

WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY, a municipal water district; CITY OF RIVERSIDE, a municipal corporation; THE GAGE CANAL COMPANY, a corporation; AGUA MANSA WATER COMPANY, a corporation, MEEKS & DALEY WATER COMPANY, a corporation; RIVERSIDE HIGHLAND WATER COMPANY, a corporation, and THE REGENTS OF THE UNIVERSITY OF CALIFORNIA,

Plaintiffs,

-vs-

(A) EAST SAN BERNARDINO COUNTY WATER DISTRICT, et al.,

Defendants

No. 78426 78426

4/7/69

JUDGMENT

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APPENDIX A -- Map showing San Bernardino Basin Area, Colton Basin Area, and Riverside Basin Area situated within San Bernardino County; Riverside Basin Area within Riverside County; Bunker Hill Dike; Riverside Narrows; and

	Boundaries of San Bernardino Valley Municipal Water District & Western Municipal Water District of Riverside County
APPENDIX B --	Extractions by Plaintiffs from San Bernardino Basin Area.
APPENDIX C --	Exports for Use on Lands not Tributary to Riverside Narrows
APPENDIX D --	Miscellaneous Data

RECITALS

(a) Complaint. The complaint in this action was filed by certain parties exporting water from the area defined herein as the San Bernardino Basin Area for use within Western, and sought a general adjudication of water rights.

(b) Orange County Water District Action. Subsequently the Orange County Water District filed an action for the adjudication of the water rights of substantially all water users in the area tributary to Prado Dam in the Santa Ana River Watershed. A decree of physical solution has been entered in such action whereby individual water users were dismissed, and San Bernardino Valley and Western assumed responsibility for the deliveries of certain flows at Riverside Narrows and Prado respectively.

(c) Physical Solution. The Judgment herein will further implement the physical solution in the Orange County Water District action, as well as determine the rights of the hereinafter named Plaintiffs to extract water from the San Bernardino Basin Area, and provide for replenishment of the area above Riverside Narrows. Such Judgment is fair and equitable, in the best interests of the parties, and in furtherance of the water policy of the State. San Bernardino Valley has the statutory power and resources to effectuate this Judgment and accordingly the other defendants may be dismissed.

(d) Stipulation. The parties named herein through their respective counsel have proposed and filed a written stipulation agreeing to the making and entry of this Judgment. By reason of such stipulation, and good cause appearing

therefor,

IT IS HEREBY ORDERED, ADJUDGED AND DECREED as follows:

I

ACTIVE PARTIES

(a) The parties to this Judgment are as follows:

(1) Plaintiff Western Municipal Water District of Riverside County, a California municipal water district, herein often called "Western", appearing and acting pursuant to Section 71751 of the Water Code;

(2) Plaintiff City of Riverside, a municipal corporation;

(3) Plaintiffs Riverside Highland Water Company, Agua Mansa Water Company and Meeks & Daley Water Company, each of which is a mutual water company and a California corporation;

(4) Plaintiff The Regents of the University of California, a California public corporation;

(5) Defendant San Bernardino Valley Municipal Water District, a California municipal water district, herein often called "San Bernardino Valley", appearing and acting pursuant to Section 71751 of the Water Code;

(b) This Judgment shall inure to the benefit of, and be binding upon, the successors and assigns of the parties.

II

DISMISSED PARTIES

All parties other than those named in the preceding Paragraph I are dismissed without prejudice.

III

PRIOR JUDGMENTS

(a) The Judgment dated and entered on May 13, 1959, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino, entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff v. Riverside Water Company, a corporation, et al., Defendants", No. 97031, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to the rights determined in that action.

(b) The Judgment dated June 23, 1965, and entered on April 21, 1966, in that certain action filed in the Superior Court of the State of California in and for the County of San Bernardino entitled and numbered "San Bernardino Valley Water Conservation District, a State Agency, Plaintiff, v. Riverside Water Company, a corporation, et al., Defendants," No. 111614, is superseded effective January 1, 1971, and for so long as this Judgment remains in effect as to any party hereto that was a party to that action, and as to any party hereto that is a successor in interest to any rights determined in that action.

(c) As used in this Paragraph III only, "party" includes any person or entity which stipulates with the parties hereto to accept this Judgment.

IV

DEFINITIONS

The following ground water basins and tributary areas are situated within the Santa Ana River watershed upstream from Riverside Narrows and are tributary thereto, and their approximate locations and boundaries for purposes of this Judgment are shown upon the map attached hereto as Appendix "A"; San Bernardino Basin Area (the area above Bunker Hill Dike, but excluding certain mountainous regions and the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins); Colton Basin Area, Riverside Basin Area within San Bernardino County, and Riverside Basin Area within Riverside County.

As used herein the following terms shall have the meanings herein set forth:

(a) Bunker Hill Dike - The San Jacinto Fault, located approximately as shown on Appendix "A", and forming the principal downstream boundary of the San Bernardino Basin Area.

(b) Riverside Narrows - That bedrock narrows in the Santa Ana River indicated on Appendix "A".

(c) Extractions - Any form of the verb or noun shall include pumping, diverting, taking or withdrawing water, either surface or subsurface, by any means whatsoever, except extractions for hydroelectric generation to the extent that such flows are returned to the stream, and except for diversions for replenishment.

(d) Natural Precipitation - Precipitation which falls naturally in the Santa Ana River watershed.

(e) Imported Water - Water brought into the Santa Ana River watershed from sources of origin outside such watershed.

(f) Replenishment - Artificial recharge of the ground water body achieved through the spreading or retention of water for the purpose of causing it to percolate and join the underlying ground water body, or injection of water into the ground water resources by means of wells; provided that as used with reference to any obligation of Western to replenish the Riverside Basin Area in Riverside County, the term replenishment shall include any water caused to be delivered by Western for which credit is received by San Bernardino Valley against its obligation under the Orange County Judgment to provide base flow at Riverside Narrows.

(g) Safe Yield - Safe yield is that maximum average annual amount of water that could be extracted from the surface and subsurface water resources of an area over a period of time sufficiently long to represent or approximate long-time mean climatological conditions, with a given areal pattern of extractions, under a particular set of physical conditions or structures as such affect the net recharge to the ground water body, and with a given amount of usable underground storage capacity, without resulting in long-term, progressive lowering of ground water levels or other undesirable result. In determining the operational criteria to avoid such adverse results, consideration shall be given to maintenance of adequate ground water quality, subsurface outflow, costs of pumping, and other relevant factors.

The amount of safe yield is dependent in part upon the amount of water which can be stored in and used from the ground water reservoir over a period of normal water supply under a given set of conditions. Safe yield is thus related to factors which influence or control ground water recharge, and

to the amount of storage space available to carry over recharge occurring in years of above average supply to years of deficient supply. Recharge, in turn, depends on the available surface water supply and the factors influencing the percolation of that supply to the water table.

Safe yield shall be determined in part through the evaluation of the average net groundwater recharge which would occur if the culture of the safe yield year had existed over a period of normal native supply.

(h) Natural Safe Yield - That portion of the safe yield of the San Bernardino Basin Area which could be derived solely from natural precipitation in the absence of imported water and the return flows therefrom, and without contributions from new conservation. If in the future any natural runoff tributary to the San Bernardino Basin Area is diverted away from that Basin Area so that it is not included in the calculation of natural safe yield, any replacement made thereof by San Bernardino Valley or entities within it from imported water shall be included in such calculation.

(i) New Conservation - Any increase in replenishment from natural precipitation which results from operation of works and facilities not now in existence, other than those works installed and operations which may be initiated to offset losses caused by increased flood control channelization.

(j) Year - A calendar year from January 1 through December 31. The term "annual" shall refer to the same period of time.

(k) Orange County Judgment - The final judgment in Orange County Water District v. City of Chino, et al., Orange County Superior Court No. 117628, as it may from time to

time be modified.

(l) Return Flow - That portion of the water applied for use in any particular ground water basin which subsequently reaches the ground water body in that basin.

(m) Five Year Period - a period of five consecutive years.

V

EXTRACTIONS FROM THE SAN BERNARDINO BASIN AREA

(a) For Use by Plaintiffs. The average annual extractions from the San Bernardino Basin Area delivered for use in each service area by each Plaintiff for the five year period ending with 1963 are hereby determined to be as set forth in Table B-1 of Appendix "B". The amount for each such Plaintiff delivered for use in each service area as set forth in Table B-1 shall be designated, for purposes of this Judgment, as its "base right" for such service area.

(b) For Use by Others. The total actual average annual extractions from the San Bernardino Basin Area by entities other than Plaintiffs for use within San Bernardino County for the five year period ending with 1963 are assumed to be 165,407 acre feet; the correct figure shall be determined by the Watermaster as herein provided.

VI

SAN BERNARDINO BASIN AREA RIGHTS AND REPLENISHMENT

(a) Determination of Natural Safe Yield. The natural safe yield of the San Bernardino Basin Area shall be computed by the Watermaster, reported to and determined initially by supplemental order of this Court, and thereafter

shall be subject to the continuing jurisdiction thereof.

(b) Annual Adjusted Rights of Plaintiffs.

1. The annual "adjusted right" of each Plaintiff to extract water from the San Bernardino Basin Area for use in each service area designated in Table B-1 shall be equal to the sum of the following:

(a) its base right for such service area, until the natural safe yield of the San Bernardino Basin Area is determined, and thereafter its percentage of such natural safe yield determined by the methods used in Table B-2; and (b) an equal percentage for each service area of any new conservation, provided the conditions of the subparagraph 2 below have been met.

2. In order that the annual adjusted right of each such Plaintiff shall include its same respective percentage of any new conservation, such Plaintiff shall pay its proportionate share of the costs thereof. Each Plaintiff shall have the right to participate in new conservation projects, under procedures to be determined by the Watermaster for notice to Plaintiffs of the planned construction of such projects. With respect to any new conservation brought about by Federal installations, the term "costs" as used herein shall refer to any local share required to be paid in connection with such project. Each Plaintiff shall make its payment at times satisfactory to the constructing agency, and new conservation shall be credited to any participating Plaintiff as such conservation is effected.

3. In any five year period, each Plaintiff shall have the right to extract from the San Bernardino Basin Area for use in each service area designated in Table B-1 an amount of water equal to five times its adjusted right for such service area; provided, however, that extractions by each Plaintiff in any year in any service area shall not exceed such Plaintiff's adjusted right for that service area by more than 30 percent.

4. If the natural safe yield of the San Bernardino Basin Area has not been determined by January 1, 1972, the initial determination thereof shall be retroactive to that date and the rights of the Plaintiffs, and the replenishment obligation of San Bernardino Valley as hereinafter set forth, shall be adjusted as of such date. Any excess extractions by Plaintiffs shall be charged against their respective adjusted rights over the next five year period, or in the alternative, Plaintiffs may pay to San Bernardino Valley the full cost of any replenishment which it has provided as replenishment for such excess extractions. Any obligation upon San Bernardino Valley to provide additional replenishment, by virtue of such retroactive determination of natural safe yield, may also be discharged over such next five year period.

5. Plaintiffs and each of them and their agents and assigns are enjoined from extracting any more water from the San Bernardino Basin Area than is permitted under this Judgment. Changes in place

of use of any such water from one service area to another shall not be made without the prior approval of Court upon a finding of compliance with Paragraph XV(b) of this Judgment. So long as San Bernardino Valley is in compliance with all its obligations hereunder, and Plaintiffs are allowed to extract the water provided for in this Judgment, Plaintiffs are further enjoined from bringing any action to limit the water extracted from the San Bernardino Basin Area for use within San Bernardino Valley.

6. Nothing in this Judgment shall prevent future agreements between San Bernardino Valley and Western under which additional extractions may be made from the San Bernardino Basin Area, subject to the availability of imported water not required by San Bernardino Valley, and subject to payment satisfactory to San Bernardino Valley for replenishment required to compensate for such additional extractions.

(c) San Bernardino Valley Replenishment. San Bernardino Valley shall provide imported water for replenishment of the San Bernardino Basin Area at least equal to the amount by which extractions therefrom for use within San Bernardino County exceed during any five year period the sum of: (a) five times the total average annual extractions determined under Paragraph V(b) hereof, adjusted as may be required by the natural safe yield of the San Bernardino Basin Area; and (b) any new conservation to which users within San Bernardino Valley are entitled. Such replenishment shall be

supplied in the year following any five year period; provided that during the first five year period, San Bernardino Valley shall supply annual amounts on account of its obligations hereunder, and such amounts shall be not less than fifty percent of the gross amount of excess extractions in the previous year.

1. Against its replenishment obligation over any five year period San Bernardino Valley shall receive credit for that portion of such excess extractions that returns to the ground water of the San Bernardino Basin Area.

2. San Bernardino Valley shall also receive credit against any future replenishment obligations for all replenishment which it provides in excess of that required herein, and for any amounts which may be extracted without replenishment obligation, which in fact are not extracted.

(d) In this subparagraph (d), "person" and "entity" mean only those persons and entities, and their successors in interest, which have stipulated with the parties to this Judgment within six months after its entry to accept this Judgment.

San Bernardino Valley agrees that the base rights of persons or entities other than Plaintiffs to extract water from the San Bernardino Basin Area for use within San Bernardino Valley will be determined by the average annual quantity extracted by such person or entity during the five year period ending with 1963. After the natural safe yield of the San Bernardino Basin Area is determined hereunder, such

base rights will be adjusted to such natural safe yield; the adjusted right of each such person or entity shall be that percentage of natural safe yield as determined hereunder from time to time which the unadjusted right of such person or entity is of the amount determined under Paragraph V(b).

San Bernardino Valley further agrees that in the event the right to extract water of any of such persons or entities in the San Bernardino Basin Area is adjudicated and legal restrictions placed on such extractions which prevent extracting of water by said persons or entities in an amount equal to their base rights, or after natural safe yield is determined, their adjusted rights, San Bernardino Valley will furnish to such persons or entities or recharge the ground water resources in the area of extraction for their benefit with imported water, without direct charge to such persons or entities therefor, so that the base rights, or adjusted rights, as the case may be, may be taken by the person or entity.

Under the provisions hereof relating to furnishing of such water by San Bernardino Valley, such persons or entities shall be entitled to extract in addition to their base rights or adjusted rights any quantities of water spread for repumping in their area of extractions, which has been delivered to them by a mutual water company under base rights or adjusted base rights included by the Watermaster under the provisions of Paragraph V (b) hereof. Extractions must be made within three years of spreading to so qualify.

VII

WATER DISCHARGED ACROSS THE BUNKER HILL DIKE

San Bernardino Valley shall keep in force an agreement with the City of San Bernardino that the present annual quantity of municipal sewage effluent discharged across Bunker Hill Dike, assumed for all purposes herein to be 16,000 acre feet annually, shall be committed to the discharge of the downstream obligations imposed on San Bernardino Valley under this Judgment or under the Orange County Judgment, and that such effluent shall comply with the requirements of the Santa Ana River Basin Regional Water Quality Control Board in effect December 31, 1968.

VIII

EXTRACTIONS FROM COLTON BASIN AREA AND RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY.

(a) The average annual extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use outside San Bernardino Valley, for the five year period ending with 1963 are assumed to be 3,349 acre feet and 20,191 acre feet, respectively; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from each such Basin Area for use outside San Bernardino Valley, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess

extractions over such 20 percent peaking allowance.

(c) To the extent that extractions from each such Basin Area for use outside San Bernardino Valley exceed the amounts specified in the next preceding Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall not be from reclaimed water produced within San Bernardino Valley. Such replenishment shall also be of a quality at least equal to the water extracted from the Basin Area being recharged; provided, that water from the State Water Project shall be deemed to be of acceptable quality. Replenishment shall be supplied to the Basin Area from which any excess extractions have occurred and in the vicinity of the place of the excess extractions to the extent required to preclude influence on the water level in the three wells below designated; provided that discharge of imported water into the Santa Ana River or Warm Creek from a connection on the State Aqueduct near the confluence thereof, if released in accordance with a schedule approved by the Watermaster to achieve compliance with the objectives of this Judgment, shall satisfy any obligation of Western to provide replenishment in the Colton Basin Area, or that portion of the Riverside Basin Area in San Bernardino County, or the Riverside Basin Area in Riverside County.

(d) Extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County, for use within San Bernardino Valley, shall not be limited. However, except for any required replenishment by Western, San Bernardino Valley shall provide the water to maintain the static water levels in the area, as determined by wells numbered

1S 4W 21 Q3, 1S 4W 29 H1, and 1S 4W 29 Q1 at an average level no lower than that which existed in the Fall season of 1963. Such 1963 average water level is hereby determined to be 822.04 feet above sea level. In future years, the level shall be computed by averaging the lowest static water levels in each of the three wells occurring at or about the same time of the year, provided that no measurements will be used which reflect the undue influence of pumping in nearby wells, or in the three wells, or pumping from the Riverside Basin in Riverside County in excess of that determined pursuant to Paragraph IX(a) hereof.

(e) Extractions by Plaintiffs from the Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County may be transferred to the San Bernardino Basin Area if the level specified in Paragraph (d) above is not maintained, but only to the extent necessary to restore such 1963 average water level, provided that Western is not in default in any of its replenishment obligations. San Bernardino Valley shall be required to replenish the San Bernardino Basin Area in an amount equal to any extractions so transferred. San Bernardino Valley shall be relieved of responsibility toward the maintenance of such 1963 average water level to the extent that Plaintiffs have physical facilities available to accommodate such transfers of extractions, and insofar as such transfers can be legally accomplished.

(f) The Colton Basin Area and the portion of the Riverside Basin Area in San Bernardino County constitute a major source of water supply for lands and inhabitants in both San Bernardino Valley and Western, and the parties hereto have a mutual interest in the maintenance of water quality in these Basin Areas and in the preservation of such supply. If

the water quality in such Areas, as monitored by the City of Riverside wells along the river, falls below the Objectives set therefor by the Santa Ana River Basin Regional Water Quality Control Board, the Court shall have jurisdiction to modify the obligations of San Bernardino Valley to include, in addition to its obligation to maintain the average 1963 water level, reasonable provisions for the maintenance of such water quality.

(g) The primary objectives of Paragraph VIII and related provisions are to allow maximum flexibility to San Bernardino Valley in the operation of a coordinated replenishment and management program, both above and below Bunker Hill Dike; to protect San Bernardino Valley against increased extractions in the area between Bunker Hill Dike and Riverside Narrows, which without adequate provision for replenishment might adversely affect base flow at Riverside Narrows, for which it is responsible under the Orange County Judgment; and to protect the area as a major source of ground water supply available to satisfy the historic extractions therefrom for use within Western, without regard to the method of operation which may be adopted by San Bernardino Valley for the San Bernardino Basin Area, and without regard to the effect of such operation upon the historic supply to the area below Bunker Hill Dike.

If these provisions should prove either inequitable or unworkable, the Court upon the application of any party hereto shall retain jurisdiction to modify this Judgment so as to regulate the area between Bunker Hill Dike and Riverside Narrows on a safe yield basis; provided that under such method of operation, (1) base rights shall be determined on the basis of total average annual extractions for use within San Bernardino Valley and Western, respectively, for the five year period ending

with 1963; (2) such base rights for use in both Districts shall be subject to whatever adjustment may be required by the safe yield of the area, and in the aggregate shall not be exceeded unless replenishment therefor is provided; (3) in calculating safe yield, the outflow from the area at Riverside Narrows shall be determined insofar as practical by the base flow obligations imposed on San Bernardino Valley under the Orange County Judgment; and (4) San Bernardino Valley shall be required to provide replenishment for any deficiency between the actual outflow and the outflow obligation across Bunker Hill Dike as established by safe yield analysis using the base period of 1934 through 1960.

IX

EXTRACTIONS FROM THE PORTION OF RIVERSIDE BASIN AREA IN RIVERSIDE COUNTY WHICH IS TRIBUTARY TO RIVERSIDE NARROWS.

(a) The average annual extractions from the portion of the Riverside Basin Area in Riverside County which is tributary to Riverside Narrows, for use in Riverside County, for the five year period ending with 1963 are assumed to be 30,044 acre feet; the correct figures shall be determined by the Watermaster as herein provided.

(b) Over any five year period, there may be extracted from such Basin Area, without replenishment obligation, an amount equal to five times such annual average for the Basin Area; provided, however, that if extractions in any year exceed such average by more than 20 percent, Western shall provide replenishment in the following year equal to the excess extractions over such 20 percent peaking allowance.

(c) To the extent that extractions from such Basin Area exceed the amounts specified in the next preceding

Paragraph (b), Western shall provide replenishment. Except for any extractions in excess of the 20 percent peaking allowance, such replenishment shall be supplied in the year following any five year period, and shall be provided at or above Riverside Narrows.

(d) Western shall also provide such replenishment to offset any reduction in return flow now contributing to the base flow at Riverside Narrows, which reduction in return flow results from the conversion of agricultural uses of water within Western to domestic or other uses connected to sewage or waste disposal systems, the effluent from which is not tributary to the rising water at Riverside Narrows.

X

REPLENISHMENT TO OFFSET NEW EXPORTS OF WATER TO AREAS NOT TRIBUTARY TO RIVERSIDE NARROWS.

Certain average annual amounts of water extracted from the San Bernardino Basin Area and the area downstream therefrom to Riverside Narrows during the five year period ending in 1963 have been exported for use outside of the area tributary to Riverside Narrows and are assumed to be 50,667 acre feet annually as set forth in Table C-1 of Appendix "C"; the correct amount shall be determined by the Watermaster as herein provided. Western shall be obligated to provide replenishment at or above Riverside Narrows for any increase over such exports by Western or entities within it from such areas for use within areas not tributary to Riverside Narrows. San Bernardino Valley shall be obligated to provide replenishment for any increase over the exports from San Bernardino Valley for use in any area not within Western nor tributary to Riverside Narrows as set forth in Table C-2 of

Appendix "C", such amounts being subject to correction by the Watermaster, or for any exports from the San Bernardino Basin Area for use in the Yucaipa, San Timoteo, Oak Glen and Beaumont Basins.

XI

REPLENISHMENT CREDITS AND ADJUSTMENT FOR QUALITY

(a) All replenishment provided by Western under Paragraph IX and all credits received against such replenishment obligation shall be subject to the same adjustments for water quality applicable to base flow at Riverside Narrows, as set forth in the Orange County Judgment.

(b) Western shall receive credit against its replenishment obligations incurred under this Judgment for the following:

1. As against its replenishment obligation under Paragraph VIII, any return flow to the Colton Basin Area or the portion of the Riverside Basin Area within San Bernardino County, respectively, resulting from any excess extractions therefrom; and as against its replenishment obligation under Paragraph IX, any return flow to the portion of the Riverside Basin Area in Riverside County, which contributes to the base flow at Riverside Narrows, resulting from any excess extractions therefrom, or from the Riverside Basin Area in San Bernardino County, or from the Colton Basin Area.

2. Subject to adjustment under Paragraph (a) hereof, any increase over the present amounts of sewage effluent discharged from

treatment plants within Riverside County which are tributary to Riverside Narrows, and which results from the use of imported water.

3. Any replenishment which may be provided in excess of that required; any amounts which hereunder are allowed to be extracted from the Colton and Riverside Basin Areas without replenishment obligation by Western, and which in fact are not extracted; any storm flows conserved between Bunker Hill Dike and Riverside Narrows by works financed solely by Western, or entities within it, which would not otherwise contribute to base flow at Riverside Narrows; and any return flow from imported water used in Riverside County which contributes to base flow at Riverside Narrows; provided, however, that such use of the underground storage capacity in each of the above situations does not adversely affect San Bernardino Valley in the discharge of its obligations at Riverside Narrows under the Orange County Judgment, nor interfere with the accomplishment by San Bernardino Valley of the primary objectives of Paragraph VIII, as stated in Subdivision (g).

(c) The replenishment obligations of Western under this Judgment shall not apply during such times as amounts of base flow at Riverside Narrows and the amounts of water stored in the ground water resources below Bunker Hill Dike and tributary to the maintenance of such flow are found by Order of the Court to be sufficient to satisfy any obligation which San Bernardino Valley may have under this Judgment, or under the

Orange County Judgment, and if the Court further finds by Order that during such times any such increase in pumping, changes in use or exports would not adversely affect San Bernardino Valley in the future.

(d) The replenishment obligations of San Bernardino Valley under Paragraph X of this Judgment for increase in exports from the Colton and Riverside Basin Areas within San Bernardino Valley below the Bunker Hill Dike shall not apply during such times as the amounts of water in the ground water resources of such area are found by Order of the Court to be sufficient to satisfy the obligations which San Bernardino Valley may have to Plaintiffs under this Judgment, and if the Court further finds by Order that during such times any such increases in exports would not adversely affect Plaintiffs in the future.

XII

CONVEYANCE OF WATER BY SAN BERNARDINO VALLEY TO RIVERSIDE NARROWS.

If San Bernardino Valley determines that it will convey reclaimed sewage effluent, or other water, to or near Riverside Narrows, to meet its obligations under this or the Orange County Judgment, the City of Riverside shall make available to San Bernardino Valley for that purpose any unused capacity in the former Riverside Water Company canal, and the Washington and Monroe Street storm drains, without cost except for any alterations or capital improvements which may be required, or any additional maintenance and operation costs which may result. The use of those facilities shall be subject to the requirements of the Santa Ana River Basin Regional Water Quality Control Board and of the State Health Department, and compliance

therewith shall be San Bernardino Valley's responsibility.

XIII

WATERMASTER

(a) This Judgment and the instructions and subsequent orders of this Court shall be administered and enforced by a Watermaster. The parties hereto shall make such measurements and furnish such information as the Watermaster may reasonably require, and the Watermaster may verify such measurements and information and obtain additional measurements and information as the Watermaster may deem appropriate.

(b) The Watermaster shall consist of a committee of two persons. San Bernardino Valley and Western shall each have the right to nominate one of such persons. Each such nomination shall be made in writing, served upon the other parties to this Judgment, and filed in Court. Such person shall be appointed by and serve at the pleasure of and until further order of this Court. If either Western or San Bernardino Valley shall at any time nominate a substitute appointee in place of the last appointee to represent it, such appointee shall be appointed by the Court in place of such last appointee.

(c) Appendix "D" to this Judgment contains some of the data which have been used in preparation of this Judgment, and shall be utilized by the Watermaster in connection with any questions of interpretation.

(d) Each and every finding and determination of the Watermaster shall be made in writing certified to be by unanimous action of both members of the Watermaster committee. In the event of failure or inability of such Watermaster Committee to reach agreement, the Watermaster committee may determine to submit the dispute to a third person to be selected

by them, or if they are unable to agree on a selection, to be selected by the Court, in which case the decision of the third person shall be binding on the parties; otherwise the fact, issue, or determination in question shall forthwith be certified to this Court by the Watermaster, and after due notice to the parties and opportunity for hearing, said matter shall be determined by order of this Court, which may refer the matter for prior recommendation to the State Water Resources Control Board. Such order of the Court shall be a determination by the Watermaster within the meaning of this Judgment.

(e) The Watermaster shall report to the Court and to each party hereto in writing not more than seven (7) months after the end of each year, or within such other time as the Court may fix, on each determination made by it pursuant to this Judgment, and such other items as the parties may mutually request or the Watermaster may deem to be appropriate. All of the books and records of the Watermaster which are used in the preparation of, or are relevant to, such reported data, determinations and reports shall be open to inspection by the parties hereto. At the request of any party this Court will establish a procedure for the filing and hearing of objections to the Watermaster's report.

(f) The fees, compensation and expenses of each person on the Watermaster shall be borne by the District which nominated such person. All other Watermaster service costs and expenses shall be borne by San Bernardino Valley and Western equally.

(g) The Watermaster shall initially compute and report to the Court the natural safe yield of the San Bernardino Basin Area, said computation to be based upon the cultural

conditions equivalent to those existing during the five calendar year period ending with 1963.

(h) The Watermaster shall as soon as practical determine the correct figures for Paragraphs V(b), VI(b)1, VIII(a), IX(a) and X, as the basis for an appropriate supplemental order of this Court.

XIV

CONTINUING JURISDICTION OF THE COURT

(a) The Court hereby reserves continuing jurisdiction of the subject matter and parties to this Judgment, and upon application of any party, or upon its own motion, may review and redetermine, among other things, the following matters and any matters incident thereto:

1. The hydrologic condition of any one or all of the separate basins described in this Judgment in order to determine from time to time the safe yield of the San Bernardino Basin Area.

2. The desirability of appointing a different Watermaster or a permanent neutral member of the Watermaster, or of changing or more clearly defining the duties of the Watermaster.

3. The desirability of providing for increases or decreases in the extraction of any particular party because of emergency requirements or in order that such party may secure its proportionate share of its rights as determined herein.

4. The adjusted rights of the Plaintiffs as required to comply with the provisions hereof with respect to changes in the natural safe yield of the San Bernardino Basin

Area. If such changes occur, the Court shall adjudge that the adjusted rights and replenishment obligations of each party shall be changed proportionately to the respective base rights.

5. Conforming the obligations of San Bernardino Valley under this Judgment to the terms of any new judgment hereafter entered adjudicating the water rights within San Bernardino Valley, if inconsistencies of the two judgments impose hardship on San Bernardino Valley.

6. Adjusting the figures in Paragraphs V(b), VI(b) 1, VIII(a) IX(a), and X, to conform to determination by the Watermaster.

7. Credit allowed for return flow in the San Bernardino Basin Area if water levels therein drop to the point of causing undue hardship upon any party.

8. Other matters not herein specifically set forth which might occur in the future and which would be of benefit to the parties in the utilization of the surface and ground water supply described in this Judgment, and not inconsistent with the respective rights of the parties as herein established and determined.

(b) Any party may apply to the Court under its continuing jurisdiction for any appropriate modification of this Judgment if its presently available sources of imported water are exhausted and it is unable to obtain additional supplies of imported water at a reasonable cost, or if there is any substantial delay in the delivery of imported water through the State Water Project.

XV

SAVING CLAUSES

(a) Nothing in this Judgment precludes San Bernardino Valley, Western, or any other party from exercising such rights as it may have or obtain under law to spread, store underground and recapture imported water, provided that any such use of the underground storage capacity of the San Bernardino Basin Area by Western or any entity within it shall not interfere with any replenishment program of the Basin Area.

(b) Changes in the place and kind of water use, and in the transfer of rights to the use of water, may be made in the absence of injury to others or prejudice to the obligations of either San Bernardino Valley or Western under Judgment or the Orange County Judgment.

(c) If any Plaintiff shall desire to transfer all or any of its water rights to extract water within San Bernardino Valley to a person, firm, or corporation, public or private, who or which is not then bound by this Judgment, such Plaintiff shall as a condition to being discharged as hereinafter provided cause such transferee to appear in this action and file a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights. Such appearance and assumption of obligation shall include the filing of a designation of the address to which shall be mailed all notices, requests, objections, reports and other papers permitted or required by the terms of this Judgment.

If any Plaintiff shall have transferred all of its said water rights and each transferee not theretofore bound by this Judgment as a Plaintiff shall have appeared in this action

and filed a valid and effective express assumption of the obligations imposed upon such Plaintiff under this Judgment as to such transferred water rights, such transferring Plaintiff shall thereupon be discharged from all obligations hereunder. If any Plaintiff shall cease to own any rights in and to the water supply declared herein and shall have caused the appearance and assumption provided for in the third preceding sentence with respect to each voluntary transfer, then upon application to this Court and after notice and hearing such Plaintiff shall thereupon be relieved and discharged from all further obligations hereunder. Any such discharge of any Plaintiff hereunder shall not impair the aggregate rights of defendant San Bernardino Valley or the responsibility hereunder of the remaining Plaintiffs or any of the successors.

(d) Non-use of any right to take water as provided herein shall not result in any loss of the right. San Bernardino Valley does not guarantee any of the rights set out herein for Western and the other Plaintiffs as against the claims of third parties not bound hereby. If Western or the other Plaintiffs herein should be prevented by acts of third parties within San Bernardino County from extracting the amounts of water allowed them by this Judgment, they shall have the right to apply to this Court for any appropriate relief, including vacation of this Judgment, in which latter case all parties shall be restored to their status prior to this Judgment insofar as possible.

(e) Any replenishment obligation imposed hereunder on San Bernardino Valley may be deferred until imported water first is available to San Bernardino Valley under its contract with the California Department of Water Resources and the

obligation so accumulated may be discharged in five approximately equal annual installments thereafter.

(f) No agreement has been reached concerning the method by which the cost of providing replenishment will be financed, and no provision of this Judgment, nor its failure to contain any provision, shall be construed to reflect any agreement relating to the taxation or assessment of extractions.

XVI

EFFECTIVE DATE

The provisions of Paragraphs III and V to XII of this Judgment shall be in effect from and after January 1, 1971; the remaining provisions are in effect immediately.

XVII

COSTS

No party shall recover its costs herein as against any other party.

THE CLERK WILL ENTER THIS JUDGMENT FORTHWITH.

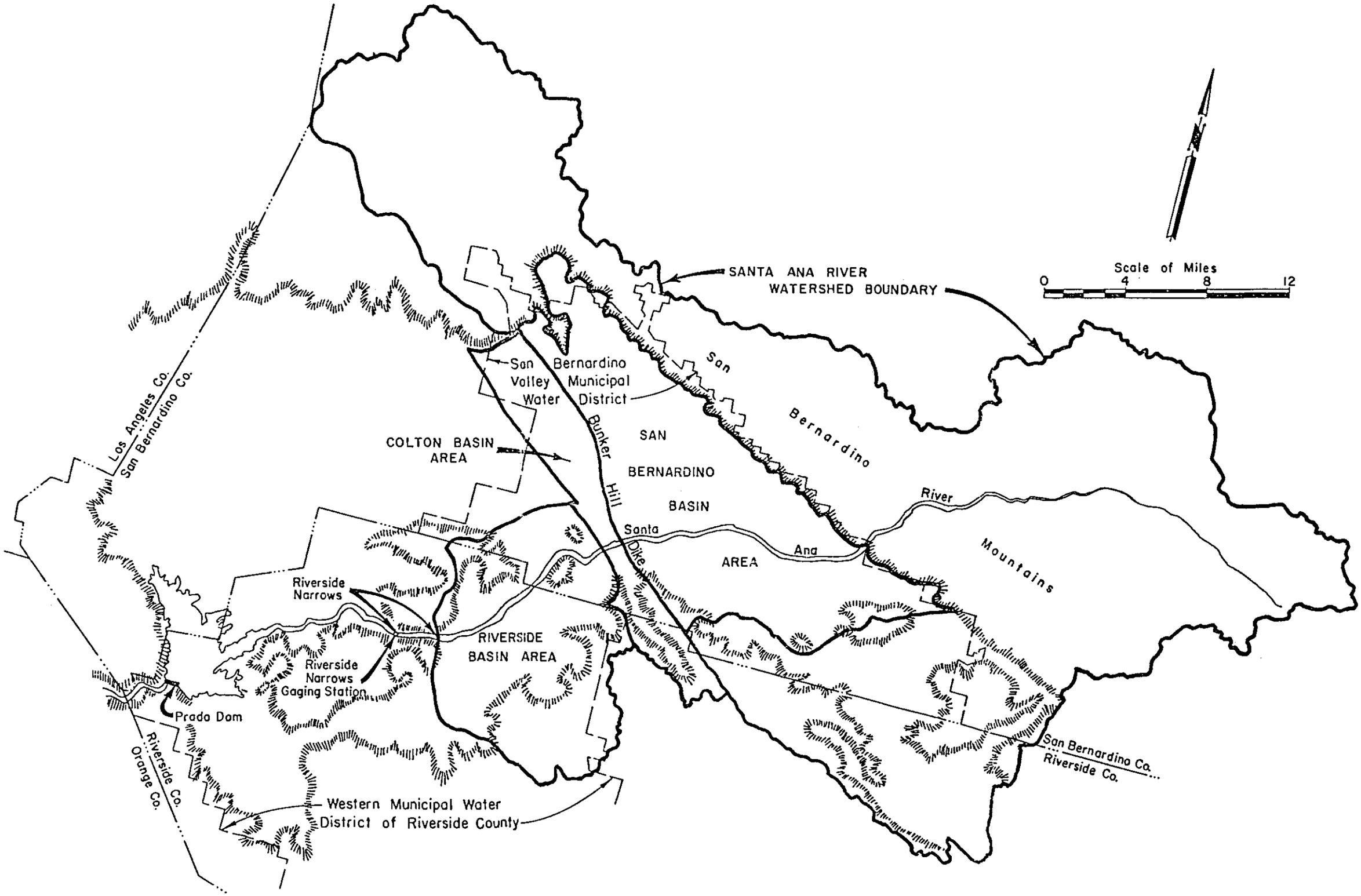
DATED: April 17, 1969

ENTERED

APR 17 1969

JUDGE OF THE SUPERIOR COURT

JUDGMENT BOOK 124 PG 42



MAP SHOWING

SAN BERNARDINO BASIN AREA, COLTON BASIN AREA, AND RIVERSIDE BASIN AREA SITUATED WITHIN SAN BERNARDINO COUNTY; RIVERSIDE BASIN AREA WITHIN RIVERSIDE COUNTY; BUNKER HILL DIKE; RIVERSIDE NARROWS; AND BOUNDARIES OF SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT & WESTERN MUNICIPAL WATER DISTRICT OF RIVERSIDE COUNTY.

APPENDIX B
TABLE B-1

EXTRACTIONS BY PLAINTIFFS FROM THE SAN BERNARDINO BASIN AREA FOR AVERAGE OF 5-YEAR PERIOD ENDING WITH 1963

(All Values in Acre Feet)
Classified According to Service Area

Plaintiff	Total Extractions in San Bernardino Basin Area	Delivery to San Bernardino Basin Area	Delivery to Colton Basin Area & Riverside Basin Area in San Bernardino County	Delivery to Areas Outside San Bernardino Valley
City of Riverside (including those rights acquired as successor to the Riverside Water Company and The Gage Canal Company)	53,448	1462	1260	50,726
Riverside High-Land Water Company	4,399	0	2509	1,890
Agua Mansa Water Company, and Meeks & Daley Water Company	8,026	0	326	7,700
The Regents of the University of California	581	0	0	581
Total	66,454	1,462	4,095	60,897

APPENDIX B
TABLE B-2

PLAINTIFFS' PERCENTAGES OF BASE RIGHT TO TOTAL PRODUCTION FROM SAN BERNARDINO VALLEY BASIN AREA,
231,861 Acre Feet Annually,
For 5-Year Average Ending With 1963
Classified According to Service Area

Plaintiff	Delivery to San Bernardino Basin Area	Delivery to Colton Basin Area & Riverside Basin Area in San Bernardino County	Delivery to Areas Outside San Bernardino Valley
City of Riverside (including those rights acquired as successor to the Riverside Water Company and The Gage Canal Company)	.630	.543	21,878
Riverside Highland Water Company		1,082	0.815
Aqua Mansa Water Company, and Meeks & Daley Water Company		.141	3.321
The Regents of the University of California			0.250
Total	.630	1.766	26.264

APPENDIX C
TABLE C-1

EXTRACTIONS FOR USE WITHIN WESTERN
FROM
THE SAN BERNARDINO BASIN AREA, COLTON BASIN AREA,
AND THE RIVERSIDE BASIN AREA
FOR USE ON LANDS THAT ARE NOT TRIBUTARY
TO THE RIVERSIDE NARROWS FOR
AVERAGE OF FIVE-YEAR PERIOD ENDING IN 1963

Extractor	Five-Year Average Ac. Ft.
City of Riverside, including Irrigation Division water extracted by Gage Canal Co. and former Riverside Water Co.	30,657
Meeks & Daley Water Co., Agua Mansa Water Co., and Temescal Water Co., including water received from City of Riverside	13,731
Extractions delivered by West Riverside Canal received from Twin Buttes Water Co., La Sierra Water Co., Agua Mansa Water Co., Salazar Water Co., West Riverside 350" Water Co., and Jurupa Water Co.	5,712
Rubidoux Community Services District	531
Jurupa Hills Water Co.	36
TOTAL	50,667

APPENDIX C
TABLE C-2

EXTRACTIONS FOR USE WITHIN SAN BERNARDINO COUNTY
FROM
SAN BERNARDINO BASIN AREA AND COLTON BASIN AREA
FOR USE ON LANDS NOT TRIBUTARY TO
NATURAL STREAMS FOR AVERAGE OF
FIVE-YEAR PERIOD ENDING WITH 1953

(ALL VALUES IN ACRE FEET)

Entity	San Bernardino Basin Area	Colton Basin Area	Total
Fontana Union Water Co.	14,272	365	14,637
West San Bernardino County Water District	2,961	947	3,908
City of Rialto			700
TOTAL			19,245

APPENDIX D
TABLE D-1

EXTRACTIONS FROM SAN BERNARDINO BASIN AREA
FOR THE AVERAGE OF FIVE-YEAR PERIOD ENDING WITH 1963
FOR USE WITHIN SAN BERNARDINO COUNTY

(ALL VALUES IN ACRE FEET)

Basin	Five Year Avg. 1959-63
Beaumont	10,064
Big Bear	1,171
Borea Canyon	91
Bunker Hill	181,600
City Creek	337
Cook Canyon	197
Devil Canyon	3,326
Devil Creek	42
Lower Cajon	2,090
Little San Creek	15
Lytle	29,364
Mill Creek	11,084
Oak Glen	935
Plunge Creek	1,265
Santa Ana	1,790
Strawberry Creek	291
San Timoteo	2,272
Waterman Canyon	367
Yucaipa	13,837
Upper Basin Total	260,139
Less: Beaumont	
Oak Glen	
San Timoteo	27,107
Yucaipa	
Subtotal	233,032
Less Big Bear	1,171
Subtotal	231,861
Less extractions for use outside San Bernardino County	60,897
Extractions from San Bernardino for use in San Bernardino County	170,964

APPENDIX D
TABLE D-2

EXTRACTIONS FROM
COLTON BASIN AREA FOR AVERAGE OF
FIVE-YEAR PERIOD ENDING WITH 1963
BY SAN BERNARDINO AND RIVERSIDE COUNTY ENTITIES
FOR USE WITHIN EACH COUNTY

(VALUES IN ACRE FEET)

Extractor	Place of Use		Total
	San Bernardino Co.	Riverside Co.	
San Bernardino County Entities	8,480	0	8,480
Riverside County Entities	147	3,349	3,496
TOTAL EXTRACTIONS	8,627	3,349	11,976

APPENDIX D
TABLE D-3

EXTRACTIONS FROM
RIVERSIDE BASIN AREA IN SAN BERNARDINO COUNTY
FOR AVERAGE FIVE-YEAR PERIOD ENDING WITH 1963
BY SAN BERNARDINO AND RIVERSIDE COUNTY ENTITIES
FOR USE WITHIN EACH COUNTY

(VALUES IN ACRE FEET)

Extractor	Place of Use		Total
	San Bernardino Co.	Riverside Co.	
San Bernardino County Entities	9,582	0	9,582
Riverside County Entities	3,929	20,191	24,120
TOTAL EXTRACTIONS	13,511	20,191	33,702

APPENDIX D
TABLE D-4

EXTRACTIONS FROM
SAN BERNARDINO BASIN AREA, COLTON BASIN AREA
AND RIVERSIDE BASIN AREA USED WITHIN
RIVERSIDE COUNTY FOR THE AVERAGE
FIVE-YEAR PERIOD ENDING WITH 1963

(ALL VALUES IN ACRE FEET)

Basin	Five-Year Average
San Bernardino Basin Area	60,897
Colton Basin Area	3,349
Riverside Basin Area in San Bernardino County	20,191
Riverside Basin Area in Riverside County	30,044
TOTAL	114,481

APPENDIX D
TABLE D-5

IRRIGATED ACREAGE IN RIVERSIDE BASIN AREA
IN RIVERSIDE COUNTY PRESENTLY TRIBUTARY
TO RIVERSIDE NARROWS WHICH
UPON CONVERSION TO URBAN USES
REQUIRING SEWAGE DISPOSAL THROUGH
THE RIVERSIDE TREATMENT PLANT WILL
BE DISCHARGED TO THE RIVER BELOW
RIVERSIDE NARROWS

Entity Serving Acreage	Acres
Gage Canal	1,752
Alta Mesa Water Co.	65
East Riverside Water Co.	926
Riverside Highland Water Company	1,173
TOTAL	3,916

APPENDIX B

VULCAN MATERIAL COMPANY
AREA Q PROJECT
WATER SUPPLY ASSESSEMENT
HALEY & ALDRICH
2019

HALEY ALDRICH

www.haleyaldrich.com

REPORT ON

WATER SUPPLY ASSESSMENT
VULCAN MATERIALS COMPANY AREA Q PROJECT
2400 WEST HIGHLAND AVENUE
SAN BERNARDINO, CALIFORNIA

by Haley & Aldrich, Inc.
Walnut Creek, California

for Harrison, Temblador, Hungerford & Johnson LLP
Sacramento, California

File No. 132051-003
October 2019



HALEY & ALDRICH, INC.
2033 N. Main Street
Suite 309
Walnut Creek, CA 94596
925.949.1012

17 October2019
File No. 132051-003

ATTORNEY-CLIENT PRIVILEGE

Harrison, Temblador, Hungerford & Johnson LLP
2801 T Street
Sacramento, California 95816

Attention: Mr. Adam Guernsey
aguernsey@hthjlaw.com

Subject: Water Supply Assessment
Vulcan Materials Company Area Q Project
2400 West Highland Avenue
San Bernardino, California

Ladies and Gentlemen:

Haley & Aldrich, Inc. (Haley & Aldrich) has completed this Water Supply Assessment (WSA) according to the requirements of Section 10910 of the California Water Code. This WSA was completed in support of the Vulcan Materials Company, Area Q Project in the County of San Bernardino, California.

The Area Q Project is located in unincorporated San Bernardino County, east of Cajon Creek and north of the community of Muscoy (Site). The project Site is bounded by residential neighborhoods to the south, a Union Pacific rail line to west, Cajon Boulevard to the east and Vulcan's existing Cajon Creek aggregates mine, with Area L to the north and Area M to the northwest. The Project site is located approximately 2.5 miles away from Vulcan's existing San Bernardino facility where material processing occurs (Main Plant), which is located directly north of State Route 210 and Highland Avenue. Nearby communities include Muscoy, the City of San Bernardino (adjacent to the east/north), and the City of Rialto (1.25 miles west).

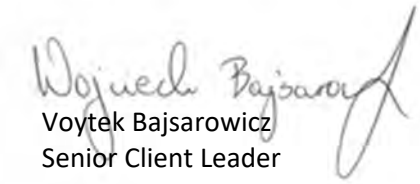
The Area Q Project calls for aggregate material extraction and ancillary activities on 187.6 acres within the 196.0-acre Area Q property, with extraction to be relocated to Area Q once extraction in Area L is complete. Future water demands at Area Q will result in no change to existing water demand at Area L. The proposed water source for Area Q is the existing well currently used to supply water to Area L.

This WSA concludes that the existing water supply is sufficient to meet projected future demand associated with the Area Q Project over the full life of the Area Q Project under normal year, single dry year, and multiple dry year conditions.

Sincerely yours,
HALEY & ALDRICH, INC.



Katy Decker, P.G.
Project Manager



Voytek Bajsarowicz
Senior Client Leader

Enclosures

Z:\132051 VMC San Bernardino Area Q\Water Supply Assessment\WSA\2019_10-17_Vulcan_SanBernardino AreaQ_WSA-Frev4.docx

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2	SBVRUWMP Regional Water Supply and Demand Projections (embedded, p. 7)

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2	Site Map with Well Location and Proposed Mine Limits

1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich) has prepared this Senate Bill 610 (SB 610) Water Supply Assessment (WSA) on behalf of Vulcan Materials Company (Vulcan) according to the requirements of Section 10910 of the California Water Code. This WSA was completed to assist San Bernardino County by providing additional information in support of the Area Q Project, located in the County of San Bernardino, California (Figure 1).

1.1 BACKGROUND

Vulcan owns and operates the Cajon Creek Quarry, located on the northwest side of the City of San Bernardino. The Cajon Creek Quarry is currently providing high-quality aggregates to Vulcan's San Bernardino processing facility (Main Plant), located approximately 2.5 miles south of the quarry. Upon depletion of aggregate resources currently extracted from the Cajon Creek Quarry (referred to as Area L), Vulcan is proposing to relocate the mining operations into an adjacent site, referred to as Area Q (the "Project").

Area Q occupies 196.0 acres of land within unincorporated San Bernardino County. The Project site is roughly triangular in shape and is bounded by Area L to the north, Cajon Boulevard to the northeast, a concrete-lined trapezoidal drainage channel known as the Devil Creek Diversion Channel to the southeast, and Southern Pacific Railroad Tracks to the west (Figure 2). Cajon Wash and Lytle Creek, tributaries of the Santa Ana River, are present opposite the Southern Pacific Railroad. Aggregate material extraction and ancillary activities will occur on a 187.6-acre portion of the Area Q property.

The Project would be initiated once extraction at Area L is completed. The Project would not involve any change to the existing mining and/or processing operations other than relocating material extraction from Area L to Area Q. The Project would not change the mining methods currently associated with Area L. The aggregate from Area Q would be transferred via a pit conveyor system to the existing transfer conveyance infrastructure already in place at Area L. Material will then be processed and shipped from Vulcan's existing and/or permitted locations in the same manner and using the same equipment/haul trucks with which the aggregate is currently being managed. No on-road haul trucks would enter or exit the Project site from public roads.

It is expected that a total of 40,000,000 tons of sand and gravel would be extracted over approximately 30 years, depending on market demand and at what point the extraction at Area L is completed. The Project would provide a high-quality source of local aggregate materials to serve the regional market, and would allow the continued operation of Vulcan's Cajon Creek and San Bernardino facilities by providing a continuing source of materials.

Water use associated with the existing Area L extraction operations is considered "baseline" for purposes of this analysis. Currently, the existing Area M groundwater well is used for dust control on the Area L pit line, Area L roads, and the Area L mine pit floor. When extraction activities relocate to Area Q at the completion of mining in Area L, all water use is expected to remain consistent with historical water use with regard both to type of beneficial use and volume. Groundwater use at Area L provides concrete evidence of the Project's future water use. Given that Project activities will not

commence until the exhaustion of reserves at Area L, the Project will not result in additional water use above baseline.

Based on this assessment, there is adequate water available to supply the proposed Project throughout its life, without interfering with existing or future groundwater uses. As respects this analysis, the Project simply calls for the continued use of water for dust control purposes as is currently occurring, but in an adjacent area. The Project water supplies are sufficient to serve the demand generated over the full life of the Project under average normal year, single dry year, and multiple dry year conditions.

The Project is independent from Vulcan's existing operations in the area with regard to this analysis.

In summary, the Project will not generate new water demand. The Project's water use will replace the water currently being used in Area L.

1.2 REGULATORY FRAMEWORK

California Water Code section 10912(a) requires preparation of a Water Supply Assessment if a proposed project meets any of the following criteria:

1. A proposed residential development of more than 500 dwelling units;
2. A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
3. A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
4. A proposed hotel or motel, or both, having more than 500 rooms;
5. A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;
6. A mixed-use project that includes one or more of the projects defined above; or
7. A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.

The Project does not include any residential development, will not employ more than 1,000 persons, does not include any structures with more than 500,000 square feet of floor space, and does not include any hotel or motel structure. The Project is a "project" within the meaning of Water Code section 10912(a), however, because the Project is for an aggregate mine located on approximately 182.1 acres, meeting the definition of an "industrial plant"[1] that occupies more than 40 acres of land.

This WSA has been compiled following the requirements of California Water Code section 10910 to support the County of San Bernardino in conducting their assessment for the Project. This WSA provides the information required for an SB 610 Water Supply Assessment, as described in the *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001 to Assist Water Suppliers, Cities, and Counties in Integrating Water and Land Use Planning* (October 2003).

[1] The Water Code does not define the term "industrial plant" but "the term 'plant' is commonly defined as including the *land*, as well as buildings, machinery and fixtures, used in carrying out a trade or industrial business." (*Center for Biological Diversity v. County of San Bernardino* (2010) 184 Cal.App.4th 1342, 1361).

The Water Code requires a WSA to determine if available water supplies are sufficient to serve the Project-related demand. Water supply adequacy for the Project and surrounding area must be evaluated for a reasonably foreseeable demand over the next 20 years under average normal year, single dry year, and multiple dry year conditions.

More specifically, a WSA must include the following components:

- A discussion with regard to whether the total projected water supplies during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses;
- An identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system;
- For water supplies including groundwater, a review of information contained in the urban water management plan relevant to the water supply, and the following additional points shall be addressed:
  - A description of the groundwater basin from which the project will be supplied;
  - For basins that have been adjudicated, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the city or the county has the legal right to pump;
  - For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted if present management conditions continue, and, if so, a description of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.
  - A detailed description and analysis of the amount and location of groundwater pumped for the project over the past 5 years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.
  - An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project

This WSA compares the Project's projected water demand with projected water supply in order to conduct an analysis of sufficiency. For matters relating to regional supply and demand, and relating to the groundwater basin, the 2015 San Bernardino Valley Regional Urban Water Management Plan, amended in 2017 (SBVRUWMP), which was prepared by Water Systems Consulting, Inc. was referenced.

2. Water Supply

This section addresses the water supply source identified for the Project and associated regional supply.

2.1 SUPPLY SOURCE AND QUANTITY

The Project will be supplied by the existing groundwater well (Figure 2) on Vulcan's separate parcel of land, Area M. The Area M groundwater well currently supplies, among other things, the active mine pit in Area L. When extraction is complete in Area L and mining in Area Q begins, the Project will be supplied with water trucks filled at the Area M well.

The Area M supply well was drilled in December of 1997 to a depth of 416 feet below ground surface (bgs). Decomposed granite bedrock was encountered at 380 feet. The well was installed to a total depth of 370 feet bgs through the overlying fine to coarse sand with gravel. A 0.08-inch slot screen was installed over the interval from 220 to 360 ft bgs. The steel casing has an internal diameter of 15.375 inches, and the borehole diameter is 26 inches. At the time of installation, the static water level was 155 feet bgs, and the recorded drawdown over a 26.5 hour pump test was 14 feet.

Table 1, below, provides data on the annual volume of groundwater pumped from the Area M well for the 19 years between 1999 and 2017, in addition to Area L pit-specific usage. These total usage values were presented to illustrate the total groundwater demand from the existing groundwater well. These data also serve to document available supply over the past 19 years. Groundwater supply extracted from the Area M well for all uses has ranged from 92 acre feet to 197 acre feet per year over the past 19 years. The average supply extracted over the past 10 years is 129.8 acre feet per year, equating to a 5-year supply volume of approximately 650 acre feet.

Table 1 also provides data on groundwater usage specific to extraction activities at Area L; this column represents activities which will be relocated to Area Q following exhaustion of Area L reserves. Area L water usage comprises approximately 15% of the total Area M well production volume. Area L groundwater use has ranged from 13.8 acre feet to 29.4 acre feet per year over the past 19 years. Over the past 10 years, the average groundwater use at Area L has been approximately 19.5 acre feet per year, equating to a 5-year baseline volume of 97.5 acre feet.

Table 1: Vulcan Historical Area M Well Production and Area L Groundwater Usage

Year	Area M Well Production[1] (Acre Feet)	Area L Mine Pit Groundwater Usage[2] (Acre Feet)	Normal/Wet/Dry Year[3]
1998	18	2.7	Wet
1999	138	20.7	Dry
2000	140	21	Dry
2001	130	19.5	Normal
2002	140	21	Dry
2003	197	29.6	Normal
2004	197	29.6	Dry
2005	196	29.4	Wet
2006	196	29.4	Wet
2007	196	29.4	Dry
2008	196	29.4	Dry
2009	196	29.4	Dry
2010	103	15.5	Dry
2011	107	16.1	Wet
2012	92	13.8	Dry
2013	101	15.2	Dry
2014	135	20.3	Dry
2015	105	15.8	Dry
2016	110	16.5	Dry
2017	153	23	Dry

Notes:

[1] Area M supply well production volumes from Integrated Resource Management, Inc. document, 2018.

[2] Area L Groundwater Usage conservatively assumed to be 15% of the total Area M well water use.

[3] Data to assess whether the calendar year was wet vs. normal vs. dry was downloaded from the California Data Exchange Center (CDEC) website. Monthly data was assessed from 1905 through 2004 (when the data set ended) from station SBD from the San Bernardino Medical Center. Years with precipitation between the 40th and 60th percentile of this data set (13.4 to 16.4 annual inches) are classified as normal, with years above or below this classified as wet or dry, respectively. For 2005 through 2017, daily data from station SCY, San Bernardino County Yard was assessed against the standard developed from the SBD data for classification.

Because the Project will be supplied by groundwater, information regarding the Site's groundwater basin is provided in this section, along with an evaluation of whether the groundwater basin can be used as a reliable source for the Project.

2.2 GROUNDWATER BASIN

The Project Site is located within the Bunker Hill Groundwater Basin, a portion of the San Bernardino Basin Area (SBBA). The Bunker Hill Groundwater Basin consists of the alluvial materials that underlie the San Bernardino Valley. This basin is bounded by contact with rocks of the San Gabriel Mountains, San Bernardino Mountains, and Crafton Hills, and by several faults. The southern boundary is the Banning fault, the east boundary is the Redlands fault, the San Andreas fault is roughly the northern boundary, the Glen Helen fault abuts the northwest boundary, and the southwest boundary is the San Jacinto fault.

The Bunker Hill Groundwater Basin contains in excess of 5 million acre feet of high-quality water of which approximately 1.5 million acre feet of water is extractable. Annual precipitation ranges between 13 to 31 inches. Recharge to the Bunker Hill Groundwater Basin historically has resulted from infiltration of runoff from the San Gabriel and San Bernardino Mountains. Combined, the Santa Ana River, Mill Creek, and Lytle Creek contribute more than 60 percent of the total recharge to the groundwater system. Lesser contributors include Cajon Creek, San Timoteo Creek, and most of the creeks flowing southward out of the San Bernardino Mountains. The sub-basin is also replenished by deep percolation of water from precipitation and resulting runoff, percolation from delivered water, and water spread in streambeds and spreading grounds. Water can also be artificially recharged by rerouting stream flows to recharge percolation basins and thorough State Water Project (SWP) turnouts.

2.3 CERTAINTY OF SUPPLY

As shown in Table 2, below, the SBVRUWMP documents a projected adequate water supply in excess of regional demand between 2020 and 2040, including in dry and multiple dry years. These excess supply values have already accounted for a 10% buffer above projected regional demand values.

However, when analyzed separately from the total regional supplies (i.e., not including surface water, recycled water, and imported water), the SBVRUWMP projects that the SBBA may have potential extractions above the basin safe yield of between 44,255 and 74,419 acre feet per year between 2020 and 2040. After accounting for return flows from over-extraction volumes, return flows from imported water deliveries, and direct deliveries, the SBVRUWMP projects a required imported water volume of between 18,226 and 37,081 acre feet between 2020 and 2040. The San Bernardino Valley Municipal Water District (Valley District) manages the groundwater basin outflows and imports water from the SWP for basin recharge as necessary. Based on the excess overall supply as documented in the SBVRUWMP (and reproduced in Table 2), the Valley District will be able to obtain additional sources beyond the SWP water for basin recharge.

Table 2: SBVRUWMP Regional Water Supply and Demand Projections

Water Year Type	Projection Totals	2020	2025	2030	2035	2040
Normal Year	Supply Totals	337,769	345,359	352,552	359,780	366,608
	Demand Totals	246,307	257,530	268,609	278,931	285,954
	Difference (Supply minus Demand)	91,462	87,829	83,943	80,849	80,654
Wet Year	Supply Totals	385,319	392,909	400,102	407,330	414,158
	Demand Totals	230,775	241,044	251,078	260,462	266,879
	Difference (Supply minus Demand)	154,544	151,865	149,024	146,868	147,279
Dry Year	Supply Totals	327,444	335,034	342,227	349,455	356,283
	Demand Totals	248,237	259,804	271,670	282,887	290,612
	Difference (Supply minus Demand)	79,207	75,230	70,557	66,568	65,671
Multiple Dry Years, Year 1	Supply Totals	327,444	335,034	342,227	349,455	356,283
	Demand Totals	244,699	256,169	267,939	279,061	286,802
	Difference (Supply minus Demand)	82,745	78,865	74,288	70,394	69,481
Multiple Dry Years, Year 2	Supply Totals	327,444	335,034	342,227	349,455	356,283
	Demand Totals	240,812	251,901	263,169	273,770	281,147
	Difference (Supply minus Demand)	86,632	83,133	79,058	75,685	75,136
Multiple Dry Years, Year 3	Supply Totals	327,444	335,034	342,227	349,455	356,283
	Demand Totals	235,333	245,997	256,719	266,757	273,769
	Difference (Supply minus Demand)	92,111	89,037	85,508	82,698	82,514

Note: All volumes are reported in acre feet per year.All data was provided in the SBVRUWMP.

2.4 GROUNDWATER MANAGEMENT

Management of the Bunker Hill Groundwater Basin is coordinated through the Valley District, which was formed in 1954 to plan long-range water supply for the San Bernardino Valley Area including the Bunker Hill Groundwater Basin. The Valley District's responsibility for long-range water supply planning includes importing supplemental water and management of the groundwater basins within its boundaries. The Valley District purchases water from the SWP for basin recharge if the Basin extraction is above the safe yield level. The framework for the basin management is provided by a 1969 court action called the Western Judgment.

The Western Judgment can be found in Appendix A. Other adjudications affecting the management of this basin include City of San Bernardino v. City of Riverside, County of San Bernardino Case No. 13754; Orange County Water District v. City of Chino, County of Orange Case No. 117628 (the Orange County Judgment); and a Consent Decree (Decree) entered in City of San Bernardino v. United States of America, United States District Court Central District, CV 96-8867 and CV 96-5205 (consolidated) among the US Environmental Protection Agency, the US Department of the Army, the City of San Bernardino, and the California Department of Toxic Substances Control.

2.5 GROUNDWATER RIGHTS

Within San Bernardino Valley's boundaries, the adjusted right is 167,238 acre feet per year, with the remainder of the water rights assigned to plaintiff agencies outside of its service area. Under the Western Judgment, the production rights of individual agencies within the San Bernardino Valley's service area are not allocated. As neither Vulcan nor any of its predecessors is party to the Western Judgment, Vulcan does not have a specific allocated water right.

Vulcan has been using groundwater from the Bunker Hill Basin within the SBBA since the Area M well was put into operation in late 1998, and before that from a prior well near the Main Plant on Highland Avenue. While there is no written documentation of a groundwater right, it can be considered to be an acquired right via long-standing beneficial use. Furthermore, the SBVRUWMP includes an acknowledgment of additional pumping from "Other/Private" sources. This value would include Vulcan's industrial use of this water. Vulcan's projected future use, including the Project use, which will replace existing use in Area L, will remain within the historical range of groundwater use.

3. Project Water Demand

Historical water use associated with Area L can be used to project future water for the Project, because future extraction activities in Area Q will be the same as current extraction activities at Area L, once mining is relocated following exhaustion of Area L. Section 2.3 provides a summary of the regional water supply from the SBVRUWMP. Data on historical water use used to estimate Project future demand are provided in Section 2.1.

3.1 DEMAND IN NORMAL, SINGLE DRY YEAR, AND MULTIPLE DRY YEARS

The Project will consist of material extraction followed by reclamation of the Site. Project water use will consist of dust control on the Area Q pit conveyor, internal roads, and pit floor. Because water use at Area L will be relocated to Area Q following completion of extraction in Area L, Area L groundwater usage is the environmental baseline for this analysis.

Project water demand will consist of water for dust control on the Area Q pit floor and pit roads, as well as dust control on a short pit conveyor to transfer material from the Area Q pit to the Area L pit. The proposed Project water demand is expected to be equivalent to the existing Area L demand, so there will be no increase in water demand from the baseline. Table 1, in Section 2.1, provides historical well production data for the Area M groundwater well, as well as the estimated historical use data for Area L (approximately 15% of the overall Area M well production).

As shown in Table 1, there is not a clear pattern in water usage in wet versus dry versus normal years. For this reason, fluctuations in demand associated with the Project associated with dry or multiple dry years, or with increased frequency of droughts due to climate change, are not anticipated.

The regional cumulative water demands (as well as projected water supply), are included in Table 2, in Section 2.3, which was compiled from tables within the SBVRUWMP. As shown, the region is projected to have adequate water supply to meet projected demand between 2020 and 2040, even during multiple dry years. Table 2 also includes 'wet year' projections, as the excess supply created during wet years can be used to recharge the groundwater basins to improve supply reliability during dry or multiple dry years.

There are no Site-specific water conservation measures proposed associated with the Project. Water demand associated with Area Q will be used for dust control. Local and/or regional conservation measures, including public outreach, metering, conservation pricing, and water waste prevention ordinances are in place and will continue to be observed.

3.2 WATER USE SECTORS

The SBVRUWMP identifies water use sectors only under each participating public water system section; cumulative totals are not included. Because the Project is not served by a public water system, there is no industrial use total to compare the Project total to. However, the existing Area L water demand and future Project water demand that would replace it are included in the projected demand listed in the "Other/Private" section. The SBVRUWMP estimates projected water demand from the "Other/Private"

section ranging down from 19,600 acre feet to 19,000 acre feet per year between 2020 and 2040. The Project, however, will not result in any new water demand in excess of the existing baseline condition.

4. Sufficiency Analysis

Water Code Section 10910(c)(4) requires the WSA to "include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and future planned uses, including agricultural and manufacturing uses." The sufficiency of water supply for the proposed Project during average years is addressed in this section.

This assessment finds that the available supply is adequate to meet the projected demand.

As shown on Table 1, annual water extraction from the Area M well for all uses has ranged from 92 acre feet to 197 acre feet per year, with an average of approximately 149 acre feet over the last 19 years. Historical Area L groundwater usage, which will be the same as the proposed Project, has ranged from approximately 13.8 acre feet per year to 29.6 acre feet per year during that same timeframe. Over the past 10 years, the average groundwater use at Area L has been approximately 19.5 acre feet per year, which has been used as the environmental baseline for this analysis.

The Project is anticipated to require a total of approximately 19.5 acre feet per year. The 19.5 acre feet results in no change to baseline usage, as it will be relocated from current use at Area L and will not result in additional water use for Area Q onsite.

Even if Project water use increased by 10%, the projected demand is well within the historical supply produced by the well and accounted for in the SBVRUWMP as "Other/Private" usage.

The SBVRUWMP documents that there is excess supply available regionally projected between 2020 and 2040 under normal year, single dry year, and multiple dry years, as reproduced here in Table 2. While groundwater demands on the SBBA are projected to exceed the safe yield level between 2020 and 2040, the excess supply in the Valley District will allow for recharge of the SBBA.

5. Conclusions

Based on evaluation of the water demand and supply associated with the Project, this assessment offers the following conclusions:

- Baseline groundwater use is approximately 19.5 acre feet per year. The Project is anticipated to require an average of approximately 19.5 acre feet per year over 30 years. Water for the proposed Project will be provided by the existing groundwater supply well located on Area M. Upon completion of reclamation, there will be no remaining demand for water.
- Based on this assessment, there is adequate water available to supply the proposed Project throughout its life, without interfering with existing or future groundwater uses. The Project water supply is sufficient to serve the demand generated over the full life of the Project under normal year, single dry year, and multiple dry year conditions.

6. References

California Department of Water Resources, 2003. *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001 to Assist Water Suppliers, Cities, and Counties in Integrating Water and Land Use Planning*, October 2003.

California Department of Water Resources, 2018. *California Data Exchange Center – Stations SBD and SCY.* Accessed 18 September 2018.

C*enter for Biological Diversity v. County of San Bernardino* (2010) 184 Cal.App.4th 1342, 1361.

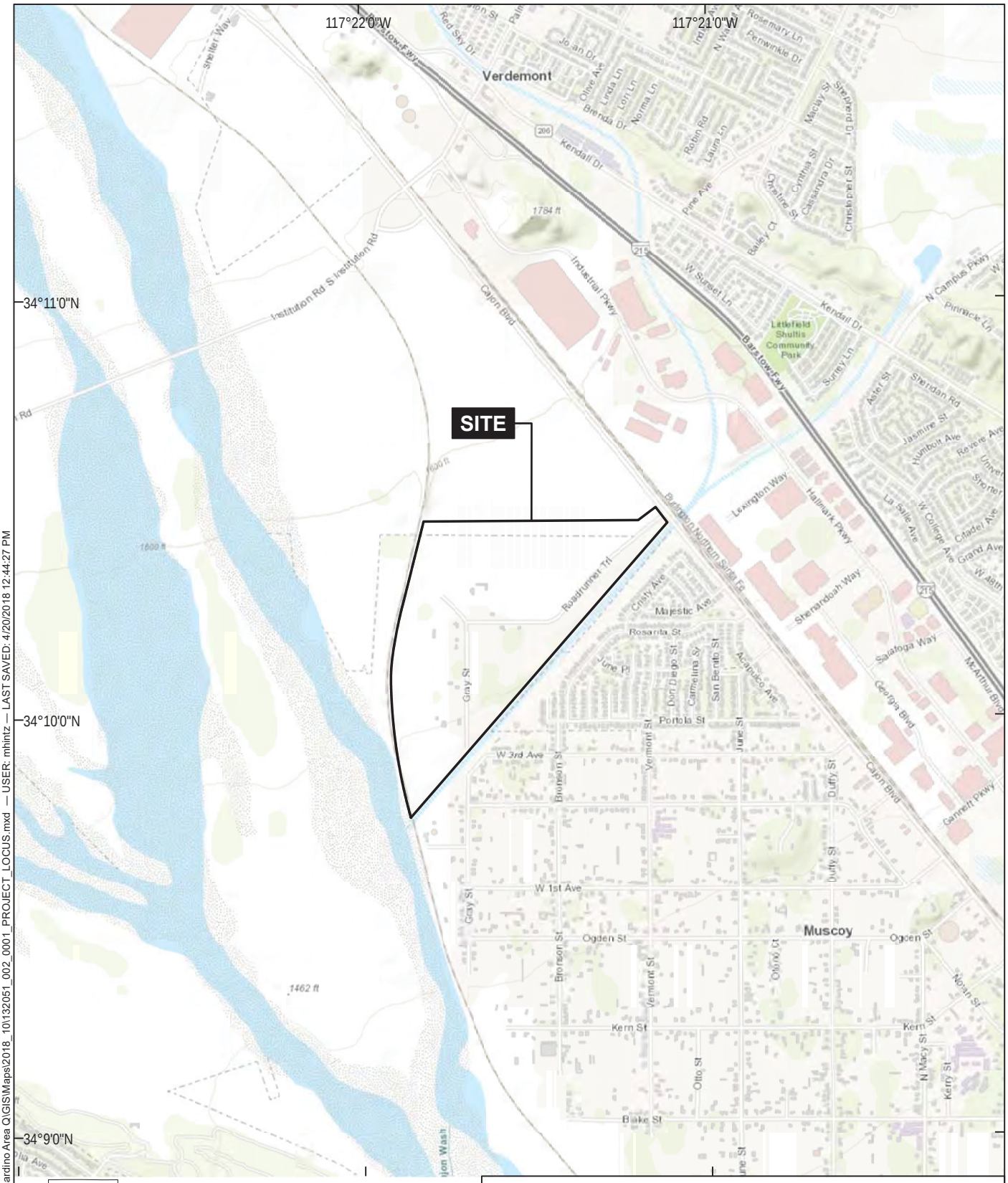
Integrated Resource Management, Inc., 14 September 2018.

Water Systems Consulting, Inc, 2017. *San Bernardino Valley Regional Urban Water Management Plan*, 2015, amended June 2017.

Western Municipal Water District et al. v. East San Bernardino County Water District (1969) Case No. 78426.

Z:\132051 VMC San Bernardino Area Q\Water Supply Assessment\WSA\2019_10-17_Vulcan_SanBernardino AreaQ_WSA-Frev4.docx

FIGURES



MAP SOURCE: ESRI
SITE COORDINATES: 34°10'13"N, 117°21'36"

HALEY ALDRICH

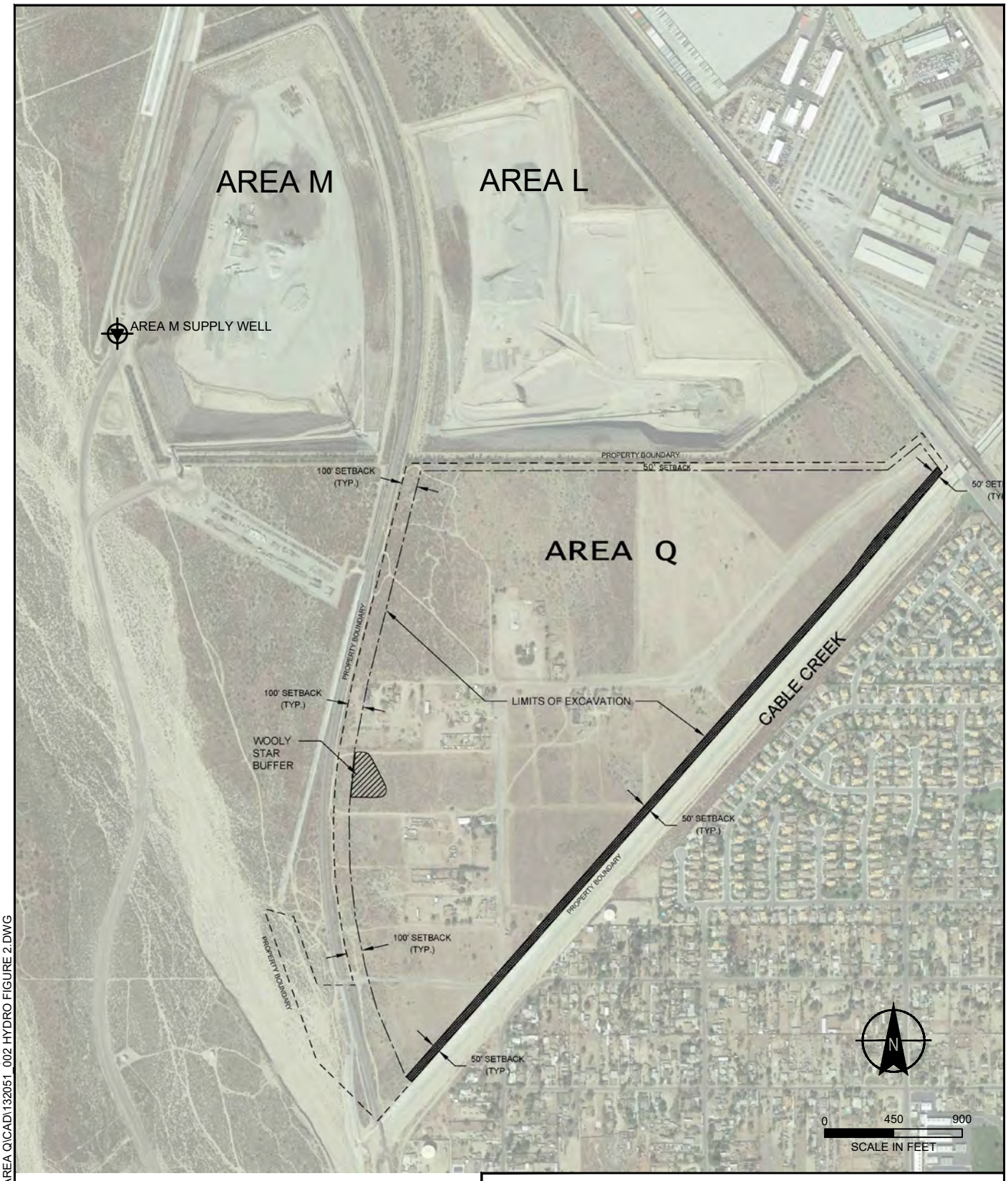
VULCAN MATERIALS COMPANY
SAN BERNARDINO MINE - AREA Q EXPANSION
2400 W. HIGHLAND AVENUE
SAN BERNARDINO, CALIFORNIA

PROJECT LOCUS

OCTOBER 2018

FIGURE 1

GIS FILE PATH: G:\132051 VMC San Bernardino Area Q\GIS\Maps\2018_10\132051_002_0001_PROJECT_LOCUS.mxd — USER: mhintz — LAST SAVED: 4/20/2018 12:44:27 PM



LEGEND

AREA M SUPPLY WELL

NOTES

1. BASE IMAGE: "VULCAN CAJON CREEK AREA Q SITE PLAN," BY SESPE CONSULTING, INC., PLOT DATE 21 FEBRUARY 2018

HALEY ALDRICH

VULCAN MATERIALS COMPANY
SAN BERNARDINO MINE - AREA Q EXPANSION
2400 W. HIGHLAND AVENUE
SAN BERNARDINO, CALIFORNIA

SITE MAP WITH WELL LOCATION AND PROPOSED MINE LIMITS

SCALE: AS SHOWN
OCTOBER 2018

FIGURE 2

HINTZ, MICAH Printed: 10/9/2018 12:56 PM Layout: FIGURE 2
G:\132051 VMC SAN BERNARDINO AREA Q\CAD\132051_002 HYDRO FIGURE 2.DWG

APPENDIX G

Hydrogeologic Investigation
(Sespe Consulting, Inc. – 2021)

SESPE CONSULTING, INC.
A Trinity Consultants Company

374 Poli Street, Suite 200 • Ventura, California 93001

HYDROGEOLOGIC INVESTIGATION

CAJON CREEK CONSOLIDATED QUARRY PROJECT

Vulcan Materials Company – Western Division
Cajon Creek & Area Q Quarries

San Bernardino County, California

September 27, 2021

Prepared for:

Vulcan Materials Company – Western Division
500 North Brand Boulevard, Suite 500
Glendale, California 91203
(951) 768-2641

Prepared by:

Sespe Consulting, Inc.
374 Poli Street, Suite 200
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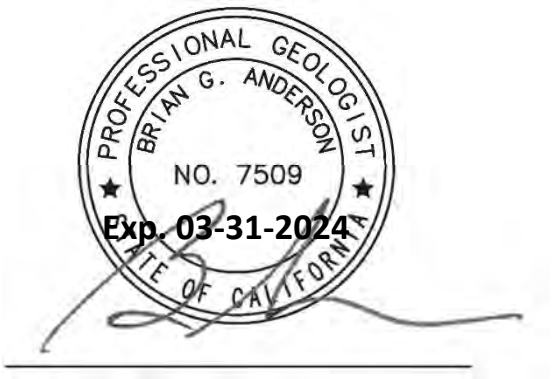
HYDROGEOLOGIC INVESTIGATION

CAJON CREEK CONSOLIDATED QUARRY PROJECT

Vulcan Materials Company – Western Division
Cajon Creek & Area Q Quarries

San Bernardino County, California

September 27, 2021



Brian G. Anderson, P.G.
Principal Geologist
Sespe Consulting, Inc.

SESPE CONSULTING, INC.
A Trinity Consultants Company

374 Poli Street, Suite 200 • Ventura, California 93001

Hydrogeologic Investigation
Cajon Creek Consolidated Quarry Project
Vulcan Materials Company – Western Division
September 27, 2021

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- Figure 4: Groundwater Basins and Hydraulic Barriers
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- Figure 7: Project Exploratory Boreholes and Groundwater Depths
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APPENDICIES

A. Exploratory Boring Logs for HA-1 and HA-2 (2021)

SESPE CONSULTING, INC.
A Trinity Consultants Company

374 Poli Street, Suite 200 • Ventura, California 93001

HYDROGEOLOGIC INVESTIGATION

Cajon Creek Consolidated Quarry Project
Vulcan Materials Company – Western Division

September 27, 2021

1.0 EXECUTIVE SUMMARY

Vulcan Materials Company proposes to consolidate its existing permitted Cajon Creek and Area Q quarries to allow for extended depth of extraction and daylighting through interior slopes. With this change in mine plan design, the currently approved Area Q Quarry reclamation plan would be amended to include the existing Cajon Creek mining Areas L and M, as well as adding Area K and a portion of Area N (hereinafter the Project). The Project would allow for mining to occur to a depth of 240 feet below the native ground surface in Areas K, L, M, Q and to 120 feet in depth within a portion of Area N. Additionally, the existing planned and approved pit slopes between Areas K, L and Q would be mined through (daylighted) under the amended mine plan design, along with the interior slope between Areas M and N. With this Project, the industrial land uses presently approved under the Cajon Creek Specific Plan for Areas N and K would change, to allow for mineral extraction in these areas; however, the overall footprint of development would not expand beyond the existing permitted boundaries.

To evaluate the viability of the Project, a hydrogeologic investigation was performed, with the objective of determining if the proposed design pit depth of 240 feet below ground surface (bgs) could be achieved without encountering groundwater. For this investigation, a comprehensive review of existing groundwater information, including flow models and local groundwater elevation data was performed, which was used to prepare a conceptual hydrogeologic model for the Project site and immediate surroundings. The model was then tested and refined based on a site-specific groundwater study, specifically advancing two exploratory boreholes in Areas L and M to delineate groundwater conditions in relation to know hydraulic barriers (faults) mapped within and along the western edge of the Project site. Based on the hydrogeologic model for the Project site, groundwater is estimated at greater than 260 feet bgs, which is more than 20 feet below the design pit depth.

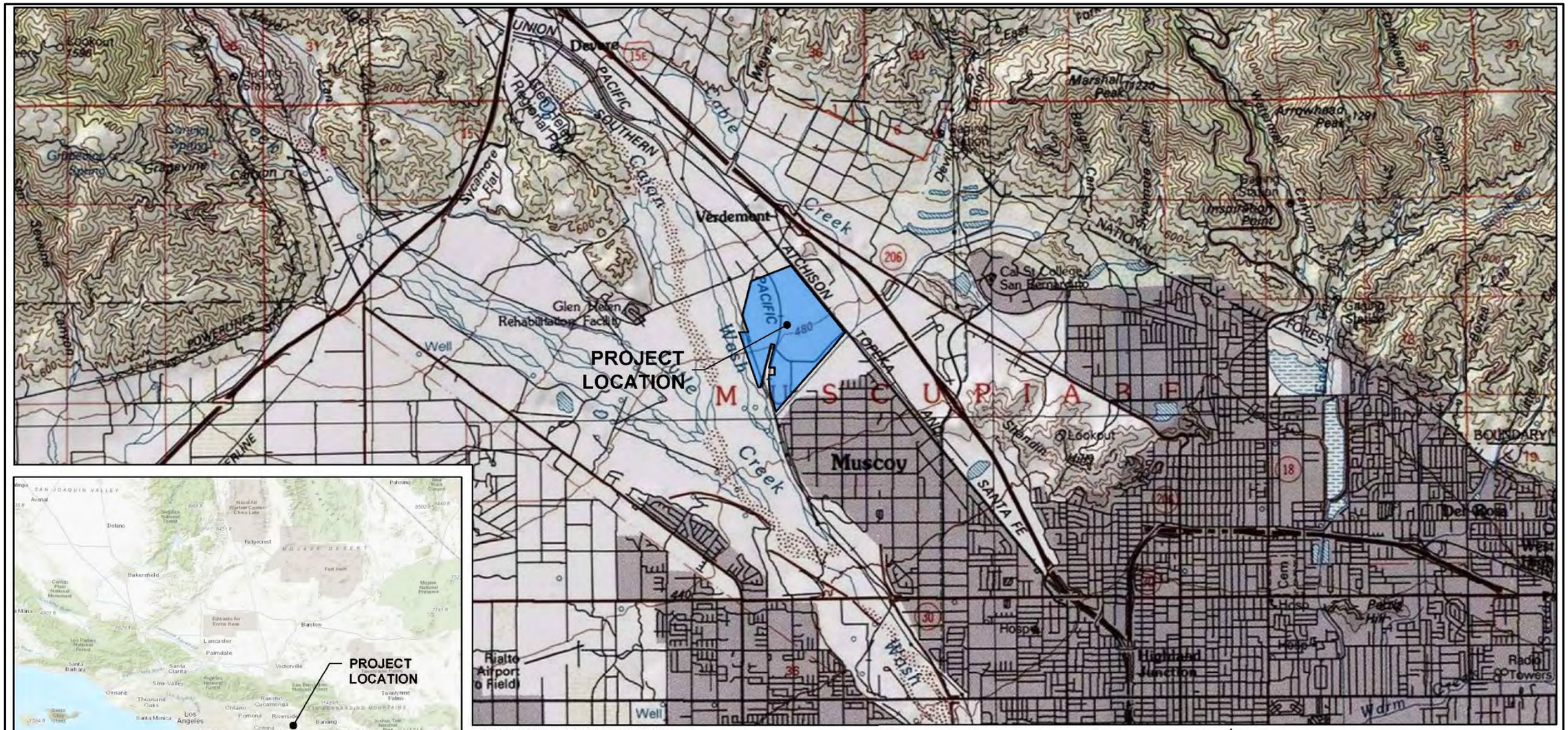
In order to evaluate whether the Project could result in sustained groundwater exposure from future changes in groundwater conditions, predictive models were examined and assess to identify the range of typical basin-scale fluctuations and forecasted long-term trends. Based on existing well data and basin inflow/outflow parameter, fluctuations in groundwater levels for the Bunker Hill Groundwater Basin that encompasses the Project area are generally plus/minus 20 feet. However, while this range may be considered as typical for future groundwater level variations at the basin scale, accounting for the effects of climate change, levels are projected to decline over the life of the Project, as analysis demonstrates

that precipitation will continue to decrease while atmospheric temperature increases, resulting is a decrease in natural recharge to the aquifer. Therefore, the observed groundwater levels recorded as part of this hydrogeologic study are expected to further decrease in the Project area, and as such exposure of groundwater by sustained inundation in mining pits and consequential loss by evaporation is not anticipated. Moreover, as part of the Project site's operations, import of clean fill would raise portions of the final in-pit grade, thus increasing the vertical profile of the unsaturated zone. In summary, this hydrogeologic investigation concludes that the modified mining and reclamation plan would have no new impacts to the aquifer underlying the Project site, specifically as it relates to groundwater exposure.

2.0 BACKGROUND

Vulcan Materials Company has two permitted quarries, the Cajon Creek and Area Q Quarries, located in San Bernardino County, California. The Cajon Creek Quarry presently operates under a Conditional Use Permit and Specific Plan approved by the City of San Bernardino, and the Area Q Quarry was approved by the County of San Bernardino in 2020. As shown in Figure 1, the two quarries are adjacent to each other; however, they are situated in two different jurisdictions and thus have separate reclamation plans. This Project, referred to as the Cajon Creek Consolidated Quarry Project, encompasses combining the existing mining areas currently permitted by the City of San Bernardino, changing the land use for certain other areas covered under the current Specific Plan for the Cajon Creek Quarry to allow for mining, and integrating these currently permitted and new proposed mining areas into the Reclamation Plan for the adjacent Area Q Quarry, permitted by the County of San Bernardino. As part of this Project, existing mining Areas L, and Q would be combined with Area K (currently designated for industrial development within the Specific Plan) to allow for one single mining area, with material extraction extending to 240 feet bgs. Additionally, existing mining Area M would be combined with Area N (previously permitted for an aggregates plant and ancillary facilities, but now used solely for equipment and material storage), which would provide for extending the current depth of Area M to 240 feet bgs and allow mining in part of Area N to 120 feet bgs. Figure 2 shows the detail plan view of these mining areas in relation to the property boundaries.

Because the Project will involve mining beyond the current pit depth of 120 feet in Areas L and N, as well as the permitted 120-foot depth for Area Q (at present mining has not initiated in this area), an understanding of the Project site and vicinity hydrogeologic framework is necessary, so that the relationship between the proposed changes in the mine plan and groundwater conditions can be assessed. Therefore, the objectives of this hydrogeologic investigation are to: 1) establish the baseline hydrogeologic setting; 2) determine groundwater elevations underneath the site; and 3) evaluate whether the extended mining depth could potentially impact groundwater through direct exposure.

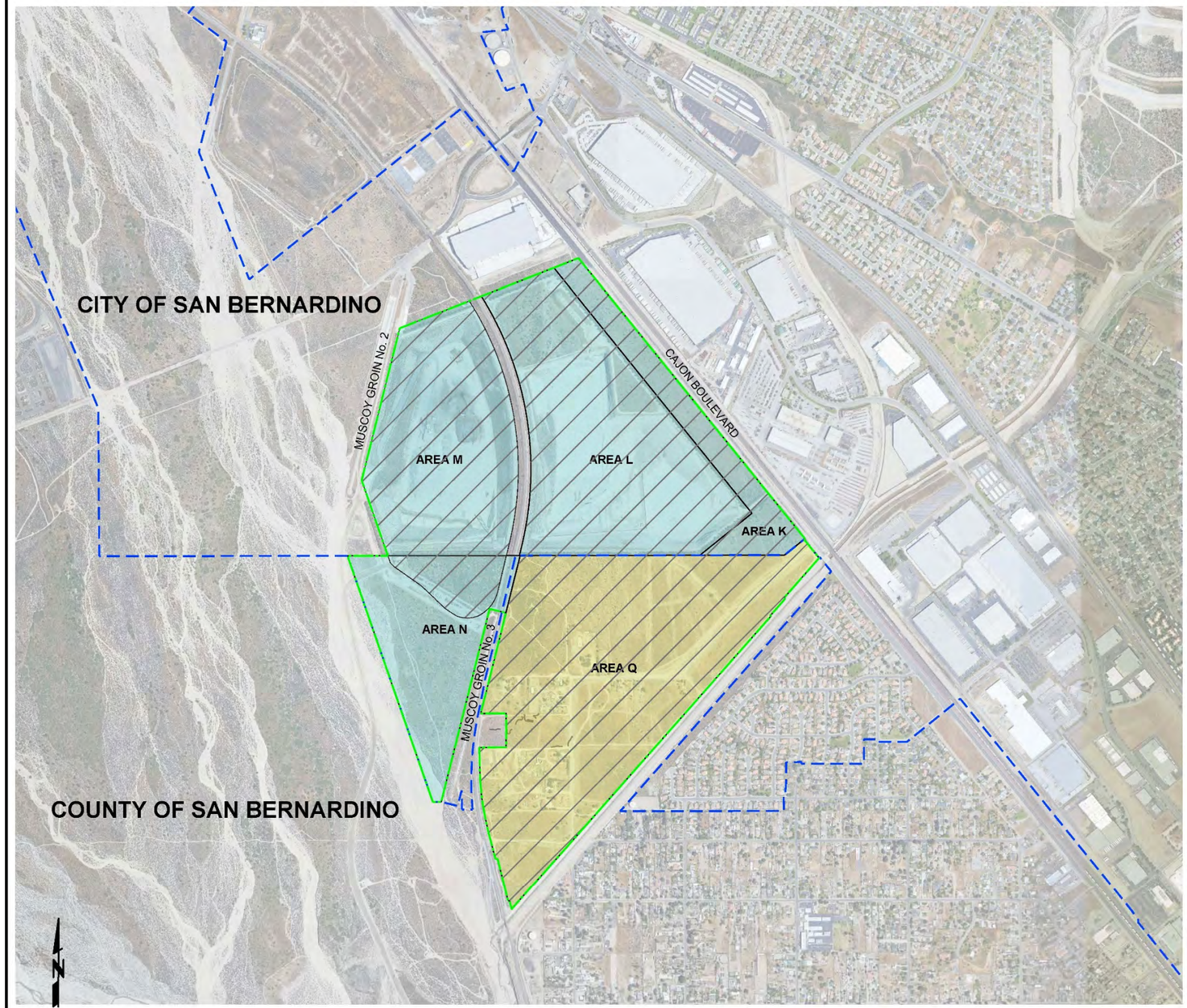


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(805) 275-1515 • www.sespeconsulting.com

PROJECT LOCATION MAP
VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA

FIGURE 1

DRAWN BY: G.CAMUS
CHECKED BY: RA
DATE: SEPTEMBER 2021



LEGEND

- — PROJECT BOUNDARY
- — JURISDICTIONAL BOUNDARY
- — AREAS IN THE CITY OF SAN BERNARDINO (CAJON CREEK QUARRY)
- — AREA IN THE COUNTY OF SAN BERNARDINO (AREA Q QUARRY)
- — CONSOLIDATED MINING AREAS

DATUM: HORZ= NAD83, CALIFORNIA ZONE
AERIAL: GOOGLE EARTH, DATED: 03/23/2019

SESPE CONSULTING, INC.
A Trinity Consultants Company.
374 Poli Street, Suite 200 • Ventura, CA 93001
(805) 275-1515 • www.sespeconsulting.com

AREAS WITHIN CITY OR COUNTY OF SAN BERNARDINO
VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA

FIGURE 2

SCALE: HORIZ. AS SHOWN; VERT. AS SHOWN
DRAWN BY: G.CAMUS
CHECKED BY: RA
DATE: SEPTEMBER 2021

3.0 METHODOLOGY

For this study, Sespe's technical approach is based on the following: 1) utilize existing site-specific and regional groundwater data to characterize the hydrogeologic setting; 2) quantify current groundwater depths underneath the Project site, based on historical and current monitoring and production well data; 3) prepare a conceptual hydrogeologic model to account for the observed groundwater conditions; 4) test the viability of the conceptual hydrogeologic model through an onsite aquifer study, which is included herein; and 5) refine and use the conceptual model and groundwater elevation data to assess whether the proposed Project could potentially adversely affect the aquifer through direct exposure.

For background, the Project site is situated in a section of the Bunker Hill and Lytle Creek Groundwater Basins. Both basins have been studied extensively over the last 30 years with respect to their capacity to serve beneficial uses, and also as part of the Federal Newmark Superfund Site clean-up action. Consequently, there is a significant number of existing studies and groundwater monitoring data throughout this part of the groundwater basin, which is used in support of the analyses presented herein.

In addition, because the Area Q Quarry was recently permitted, pursuant to the California Environmental Quality Act (CEQA) an Environmental Impact Report (EIR) was prepared by San Bernardino County for that project, which includes a description of the Project area geology and hydrogeology, as well as relevant technical studies. Similarly, an EIR and supporting technical studies were previously prepared for the existing Cajon Creek Quarry. Taken together, these environmental documents and the information pertaining to the Newmark site provide detailed information about the Project vicinity hydrogeology.

To supplement information contained in the prior studies and CEQA documents, the conceptual hydrogeologic model developed from existing area and site monitoring data was used to guide the scope of onsite investigation into the nature and occurrence of groundwater underneath the Project. More specifically, this model formed the basis for predicting groundwater elevations and flow characteristics in relation to the proposed Project mine plan. Model efficacy was evaluated and refined through onsite subsurface investigatory activities described below.

Because the Project involves extracting materials at a deeper depth, and consequentially extending the mining area's side slopes, a geotechnical study was prepared Haley & Aldrich (2021), which included an onsite exploratory drilling and materials sampling program. As part of the drilling campaign, select boreholes were advanced to groundwater in support of the site-specific conceptual hydrogeologic site model. This groundwater information was then integrated with existing geologic and hydrogeologic data to validate the Project hydrogeologic model, which takes into account the hydrostratigraphic discontinuity formed by localized faulting, notably in this case the Glen Helen Fault (GHF) and an associated splay. These subsurface data facilitated testing and refining the model, which in turn, was relied upon to evaluate whether the Project's proposed 240-foot bgs pit depth represents a viable design for material extraction using "dry-mining" methods.

3.1 Regional Hydrogeologic Setting

As previously mentioned, given the Project's location within the Newmark Federal Superfund Site, there is a robust record of geologic and hydrogeologic work that has been performed, describing the geologic framework and groundwater system in the area. Therefore, much of the discussion that follows is sourced from this prior work, as well as the Area Q EIR and related technical studies.

The Project site is situated in northwestern San Bernardino Valley near the base of the San Bernardino Mountains. The San Bernardino Valley is comprised of a series of coalesced alluvial fans that initiate from the San Gabriel Mountains to the northwest and the San Bernardino Mountains to the northeast. These alluvial fans formed where the Santa Ana River, Mill, Lytle, Cajon, Devil Canyon, East Twin, and City Creeks leave the mountains and combine, resulting in a broad alluvial plain that forms the central part of the San Bernardino Valley (Dutcher and Garrett 1963).

Within the Project vicinity, the geology is representative of braided, alluvial lithofacies that typically form within medial to distal fan complexes. Please refer to Figure 3 for a map of the Project area surface geology, as prepared by Morton and Miller (2006). The Project site geology consists of three distinct alluvial lithofacies, based on the USGS Geologic Map of the San Bernardino North 7.5-Minute Quadrangle, San Bernardino County, California (Miller and Matti, 2001). Late Holocene upper terrace sand and gravel deposits bisect part of the Project site, which appear to exhibit a southeast trending depositional dip. Larger clast sizes vary in this unit, as the occurrence of pebbles and boulders are described sparse to abundant. Older, slightly dissected and weakly consolidated to cemented Holocene and late Pleistocene age alluvial deposits are mapped within the Project area. This lithofacies is characterized by angular to subangular silt, sand and pebbles. The apparent depositional dip is similar to that of the younger upper terrace deposits. To the west of these lithofacies very young surficial deposits are mapped, which exhibit a geometry generally consistent with an active channel braid of Cajon Creek wash. This unit consists of unconsolidated to locally cemented sand, gravel and boulder deposits, that typically show fresh flood scour and channel-and-bar geometries. Together with other Quaternary units, these alluvial deposits form a valley-fill succession that can exceed over 800 feet in thickness (Danskin et al., 2006). These alluvial deposits overlie crystalline bedrock, comprised of igneous and metamorphic rocks (Dutcher and Garrett, 1963).

Several bedrock hills protrude above the alluvial basin fill in the Project area, such as the Shandin Hills to the southeast. These exposures are interpreted as having been elevated by differential movement along bedrock faults (Dutcher and Garrett 1963). Well logs indicate similar buried bedrock "highs" exist at shallow depths beneath the valley floor, and considered to be controlling factors in the deposition of older alluvium.

Northwestward trending faults, notably the San Andreas and San Jacinto Faults, bound the San Bernardino Valley. The dissected scarp of the San Andreas Fault rises above the valley edge to elevations ranging from about 2,700 feet at the mouth of Cajon Creek to more than 5,500 feet at the mouth of the Santa Ana River canyon. Ridges associated with the San Jacinto Fault are some of the major structural features in southern California. In addition, a number of other faults conjugate or subparallel to the San Andreas and

San Jacinto Faults have been mapped within the basin, including the GHF and related splay, which extend across the western part of the Project site (see fault lines on Figure 3).

The segment of the GHF in the Project vicinity is described as a dextral, strike-slip fault that is mapped as concealed in the Project area (Morton and Miller 2006). Near the top of the access ramp into Area M, there is a fault splay associated with the GHF. As discussed in more detail below, these two geologic structures, as well as other faults in the area are considered to be hydraulic barriers, thus controlling groundwater flow in the immediate Project vicinity (Danskin et al., 2006; URS, 1993). For context, Figure 4 shows the mapped faults that act as hydraulic barriers to groundwater flow.

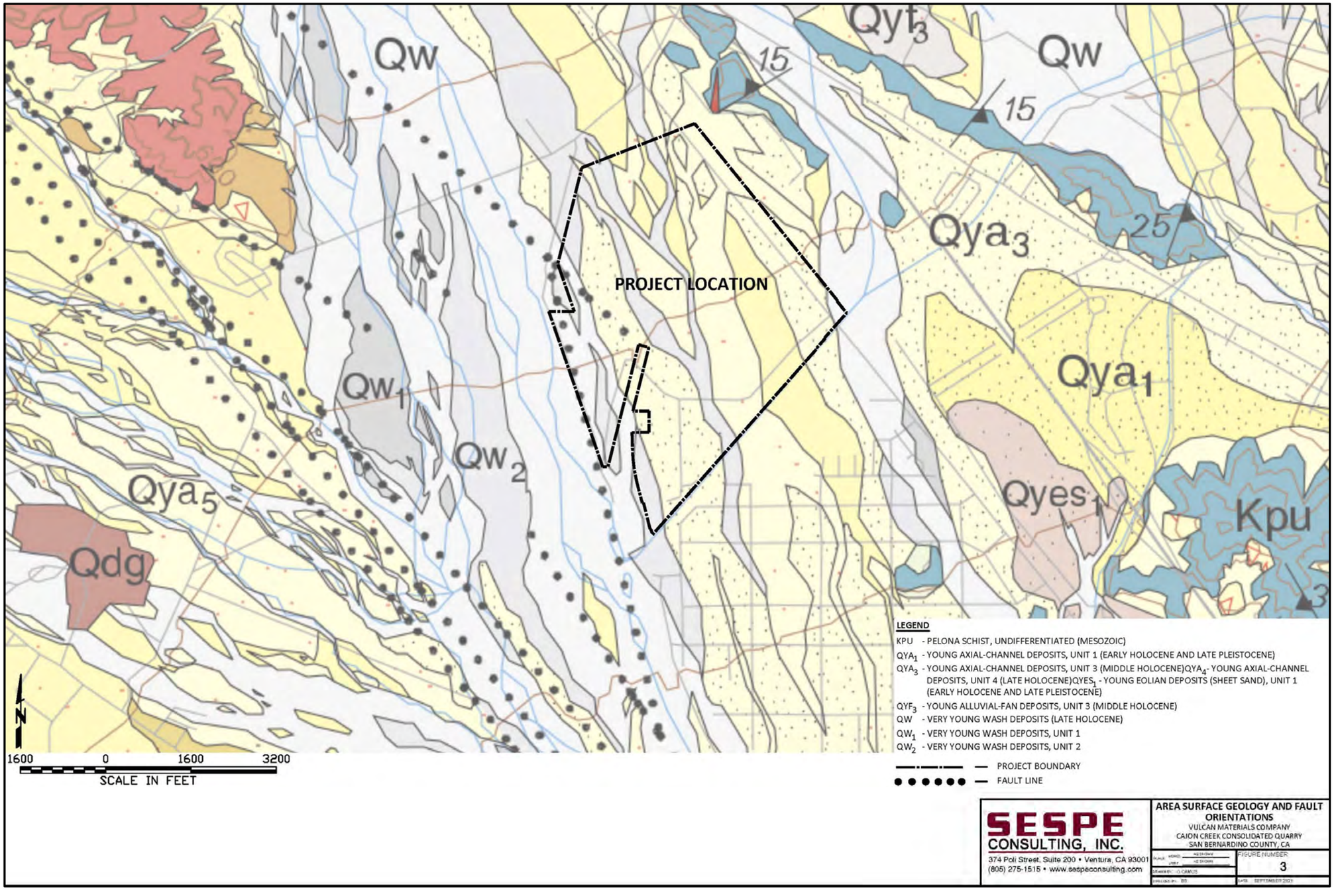
The alluvial basin fill serves as the primary aquifer, with most of the San Bernardino Valley groundwater production wells completed within these stratigraphic units. The small quantity of groundwater that is found in, or moves through, consolidated and crystalline rocks surrounding and underlying the valley fill is considered negligible (Danskin et al., 2006).

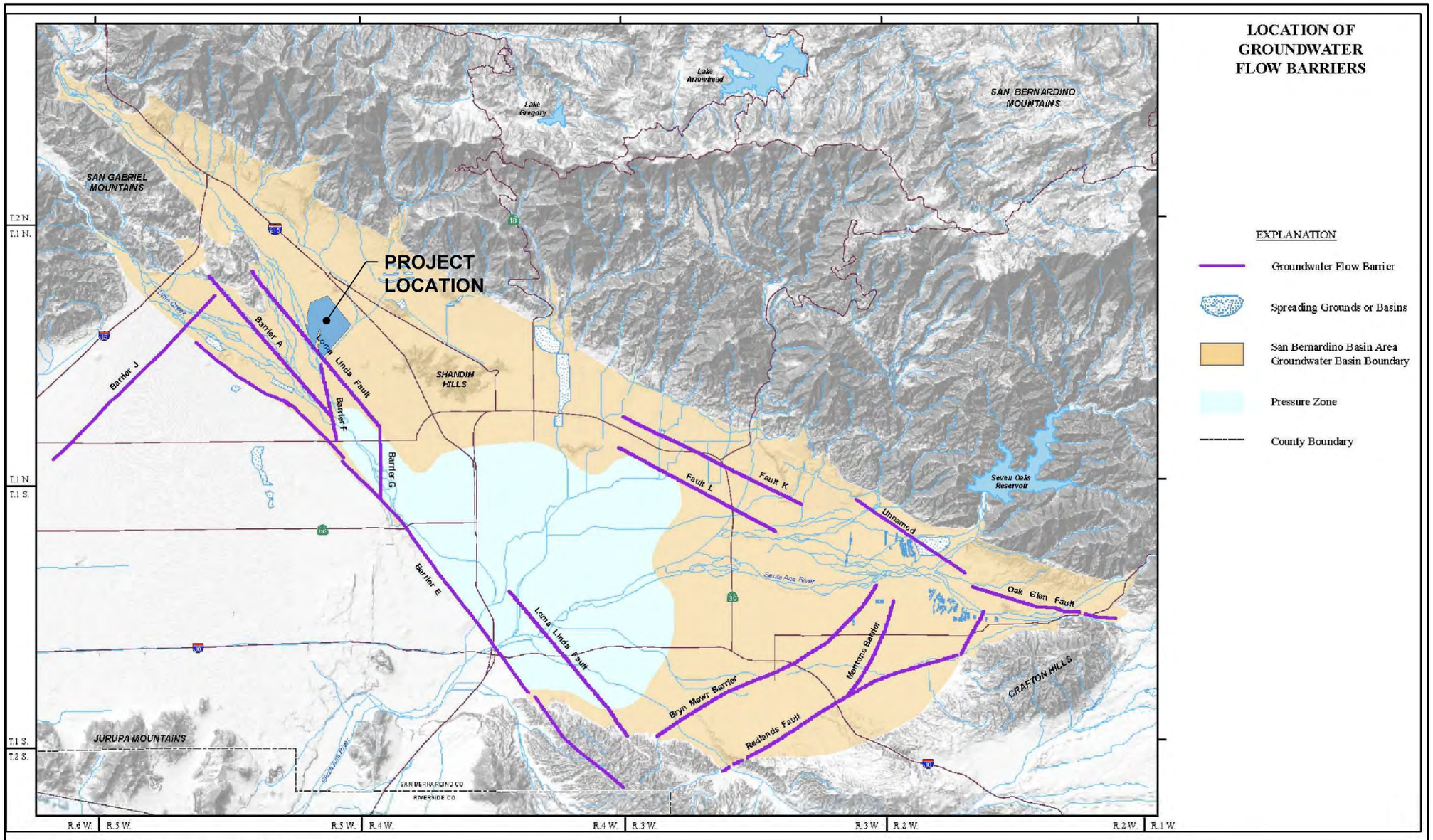
In the Project area, Dutcher and Garrett (1963) recognize two distinct groundwater basins within the alluvial aquifer: Lytle Creek and Bunker Hill Groundwater Basins as shown in Figure 4. Both of these basins are characterized by unconsolidated alluvium and sedimentary strata, which overlie older crystalline bedrock. The unconsolidated alluvial deposits constitute the primary reservoir for storing large quantities of water. According to Danskin et al. (2006), certain stratigraphic zones exhibit a high specific yield, particularly in zones where the alluvium is dominated by well sorted sands and gravels.

The unconsolidated deposits have been divided further by Dutcher and Garrett into older (Pleistocene) and younger (Holocene) alluvium and Holocene river-channel deposits. The thin river-channel deposits are among the most permeable sediments in the San Bernardino area and cause large seepage losses from streams. Hydraulic conductivity for these deposits ranges from about 40 to 100 feet per day (Dutcher and Garrett, 1963). Transmissivity values are also relatively large at 173,200 to 415,400 gallons per day per foot, with an average 236,360 gallons per foot per day (URS, 1993). In contrast, the mapped faults which cross-cut the alluvial basin sediments are modeled in prior studies as exhibiting low conductivity values, with transmissivities of less than 670 square feet per day (Hardt and Hutchinson, 1980). More recent models assign conductivities for the Quaternary faults as ranging from 0.00005 ft/day to 1 ft/day (Geoscience Support Services, 2009).

Sedimentary rocks crop out mainly in the southern part of the San Bernardino area between the San Jacinto fault and Crafton Hills and underlie unconsolidated deposits near Redlands, California. Well yields are moderate from the more permeable layers, generally less than 1 cubic feet per second; and hydraulic conductivity ranges from 7 to 29 feet per day (Dutcher and Garrett, 1963; Dutcher and Fenzel, 1972).

The alluvial aquifer has been divided by Dutcher and Garrett (1963) into six hydrostratigraphic units: 1) an upper confining member; 2) an upper water-bearing zone; 3) a middle confining member; 4) a middle water bearing zone; 5) a lower confining member; and, 6) a lower water-bearing zone.


Qw
Qyf3
Qw
15
15
25
Qya3
PROJECT LOCATION
Qya1
Qw1
Qw2
Qya5
Qdg
Qyes1
Kpu
3
N
1600 0 1600 3200
SCALE IN FEET
LEGEND
KPU - PELONA SCHIST, UNDIFFERENTIATED (MESOZOIC)
QYA1 - YOUNG AXIAL-CHANNEL DEPOSITS, UNIT 1 (EARLY HOLOCENE AND LATE PLEISTOCENE)
QYA3 - YOUNG AXIAL-CHANNEL DEPOSITS, UNIT 3 (MIDDLE HOLOCENE)QYA4 - YOUNG AXIAL-CHANNEL DEPOSITS, UNIT 4 (LATE HOLOCENE)QYES1 - YOUNG EOLIAN DEPOSITS (SHEET SAND), UNIT 1 (EARLY HOLOCENE AND LATE PLEISTOCENE)
QYF3 - YOUNG ALLUVIAL-FAN DEPOSITS, UNIT 3 (MIDDLE HOLOCENE)
QW - VERY YOUNG WASH DEPOSITS (LATE HOLOCENE)
QW1 - VERY YOUNG WASH DEPOSITS, UNIT 1
QW2 - VERY YOUNG WASH DEPOSITS, UNIT 2
PROJECT BOUNDARY
FAULT LINE
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AREA SURFACE GEOLOGY AND FAULT ORIENTATIONS
VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA
FIGURE NUMBER
3
SEPTEMBER 2021



SOURCE: SAN BERNARDINO BASIN AREA REFINED BASIN FLOW MODEL AND SOLUTE TRANSPORT MODEL REPORT, FIGURE 68, LAYER 1, PREPARED 30-SEP-09 FOR SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT BY GEOSCIENCE SUPPORT SERVICES, INC.

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GROUNDWATER BASINS AND HYDRAULIC BARRIERS
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CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA

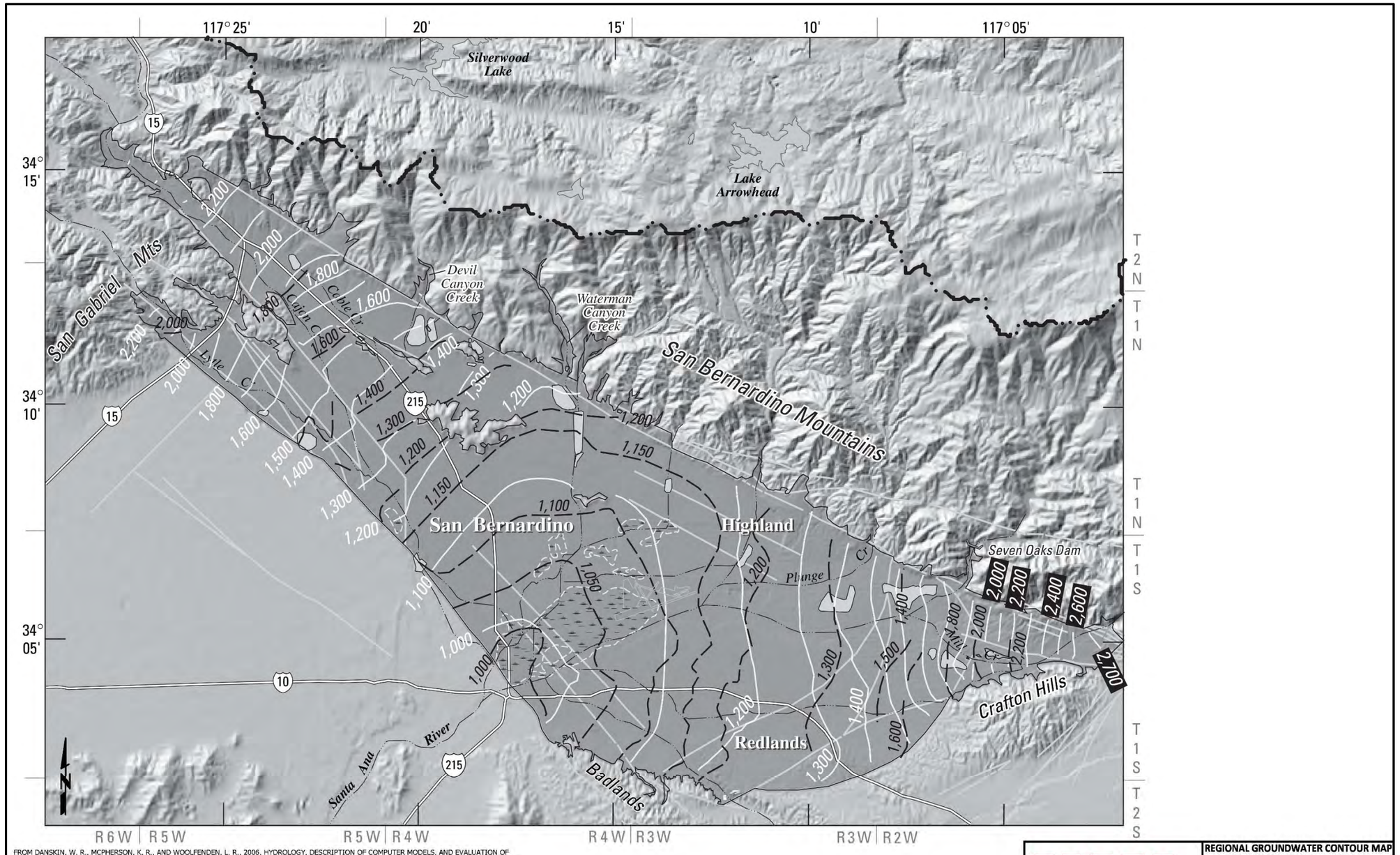
FIGURE NUMBER 4
DRAWN BY: G.CAMUS
CHECKED BY: BS
DATE: SEPTEMBER 2021

The upper and middle water-bearing zones provide most of the water to municipal and agricultural wells. In the central part of the San Bernardino area, these zones are separated by as much as 300-feet of interbedded silt, clay, and sand (the middle confining member). This middle confining member produces confined conditions over the central part of the basin, but thins and becomes less effective toward the margins of the basin (Dutcher and Garrett, 1963). In the area where the middle confining layer is effective, it is referred to locally as the confined area (Mendenhall, 1905; Dutcher and Garrett, 1963). Although not as permeable as the adjacent water-bearing zones, the middle confining member also yields significant quantities of water to wells (Dutcher and Garrett, 1963).

The lower confining member and lower water-bearing zone play a lesser role in the valley-fill aquifer. When penetrated by a production well, the lower confining member is used to increase the yield of the well. The lower water-bearing zone may be composed of poorly consolidated or partly cemented older alluvium, or may be composed solely of even older sedimentary rocks. In either case, the top of the lower water-bearing zone forms the effective bottom of the groundwater flow system within the valley-fill aquifer (Danskin et al., 2006; Dutcher and Garrett, 1963).

Man-made hydrologic features in the Project area include various percolation basins and conveyance structures and pipelines. The percolation basins can range in size from 5,000 to as much as 20 million square feet. These basins are used to provide additional groundwater recharge to the alluvial aquifer, and influence the surface water flow patterns. Moreover, to handle surface water run-off from residential and commercial developments, concrete-lined drainage systems have been constructed, such as the Devil Creek Diversion Channel that borders the southern Project boundary.

Groundwater in the San Bernardino basin generally follows the surface-drainage pattern, and generally moves southwestward, except in the Lytle and Cajon Creek areas where it moves south-eastward, and converges toward a common line of discharge at the San Jacinto fault beneath the Santa Ana River (Hardt and Hutchinson, 1980). Figure 5 presents a generalized regional groundwater contour map in relation to hydraulic barrier effects for groundwater basins within the Upper Santa Ana River Watershed. Although these contours are based on earlier groundwater data compiled by Danskin et al. (2006), the relative flow characteristics and offset groundwater levels across the faults remain essentially unchanged, and have been reaffirmed through subsequent studies (Geoscience Support Services, 2009). As was previously mentioned geologic structures in the Project area have a pronounced effect on regional groundwater, influencing flow conditions and elevations. In the case of the San Jacinto Fault, which generally runs perpendicular to groundwater flow, it acts as a partial barrier resulting in water level differences across the fault (IRWMP, 2015). As discussed as part of the conceptual hydrogeologic model presented below, similarly the GHF also controls groundwater elevations in the immediate Project setting, as well as possibly the associated fault splay.



FROM DANSKIN, W. R., MCPHERSON, K. R., AND WOOLFENDEN, L. R., 2006. HYDROLOGY, DESCRIPTION OF COMPUTER MODELS, AND EVALUATION OF SELECTED WATER- MANAGEMENT ALTERNATIVES IN THE SAN BERNARDINO AREA, CALIFORNIA. U.S. GEOLOGICAL SURVEY OPEN-FILE REPORT 2005-1278.

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REGIONAL GROUNDWATER CONTOUR MAP
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CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA 92407

FIGURE 5

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CHECKED BY: BA
DATE: SEPTEMBER 2021

Based on the optimization model developed by Danskin et al. (2006), most of the natural recharge to the valley-fill aquifer occurs during years with unusually abundant runoff, which occurs on average about once every 5 to 10 years. The Lytle Creek basin is recharged primarily from mountain front infiltration and the Lytle Creek headwaters, along with other artificial sources. Although the basin aquifer is considered to be highly permeable, groundwater measurements in wells several miles southwest of the Project site indicate that water levels can fluctuate significantly over short periods of time (IRWMP, 2015). Because there are faults that bound the Lytle Creek basin that are known barriers to groundwater flow, such fluctuations in water levels would not be expected to appreciably translate to the adjoining Bunker Hill basin.

3.2 Conceptual Hydrogeologic Model

As part of the analysis performed to evaluate groundwater conditions underneath the Project site and surroundings, a conceptual hydrogeologic model was developed. The conceptual hydrogeologic model was prepared using existing groundwater data collected from area wells, including several Project area monitoring wells, prior geologic maps and related studies, drill logs and environmental documents and records pertaining to the Newark Superfund site. With the Newmark Superfund matter, numerous studies and subsurface investigations have been conducted within the immediate Project area. Consequently, there is an extensive record of geologic and hydrogeologic information associated with the Newmark site that is applicable to the objectives of this hydrogeologic investigation.

Previous studies have documented that the geologic structural setting in this portion of the San Bernardino basin has a pronounced effect on groundwater in the basin (Danskin et al., 2006; Dutcher and Garrett, 1963). Strike-slip faults generally orientated northeast-southwest, in part, contribute to defining the subsurface hydraulic setting. More specifically, regional faulting has a hydraulic affect, thereby influencing groundwater flow paths, gradients and elevations (URS, 1993). For example, within the immediate Project area, a concealed segment of the GHF, a dextral strike-slip fault that extends through part of Area M and Area Q, along with a related unnamed fault splay. The GHF is also referred to as the Loma Lind Fault in certain studies (for example, the 2005 San Bernardino Valley Water Conservation District [SBVWCD] Engineering Investigation report). Here, based on orientation and position with respect to the GHF, we interpret the fault splay to be hydraulically equivalent to Barrier F, as identified in Danskin et al. (2006).

The area encompassing the Project site is underlain by two discrete groundwater basins, Lytle Creek and Bunker Hill (Dutcher and Garrett, 1963). These basins are defined principally by the hydrogeologic discontinuities discussed above, most notably the GHF, which serves as the southwest basin boundary for the Bunker Hill Groundwater Basin (refer back to Figure 3). In relation to the Project site, except for a portion of the southwest corner of Area M along the existing pit wall and part of Area N, all mining areas are situated east of mapped GHF and fault splay segments.

Within the Lytle Creek Groundwater Basin, the fault splay bisects this basin and has been determined to restrict water movement. Dutcher and Garrett (1963) have attributed as much as 100 feet in groundwater level difference across this barrier, with elevations being lower on the east side of this fault. Therefore,

as is the case for the GHF for the conceptual model we infer that groundwater levels will be deeper underneath the Project site east of this barrier.

With this conceptual model, across these geologic structures groundwater elevation contours would be expected to be offset, but flow directions would essentially be in the same general direction. In the case of Barrier F, Sespe interprets the groundwater gradient to increase as water moves downgradient toward the fault, since the fault is anticipated to represent a plane of lower hydraulic conductivity. Regardless, groundwater would continue moving southwesterly across Barrier F from the upper basin to the lower Lytle Creek basin, which is supported by the analysis presented in Dutcher and Garrett (1963).

With this model, the aquifer is considered an upper, unconfined to semi-confined water-bearing hydrostratigraphic unit, with groundwater moving generally to the southwest (Danskin et al., 2006). Consistent with the model optimization presented by Danskin et al. (2006), Sespe's conceptual model envisions that the upper layer is underlain by confining hydrostratigraphic units, and faults act as flow impeding elements with the upper layer. While there are a series of pumping wells to the east that extract groundwater for treatment as part of the Newmark Superfund site remediation system, given their distance the resultant drawdown is not considered to any effect on groundwater levels underneath the Project site. The nearest extraction wells are associated with the Newmark Operable Unit, and are situated more than 2 miles away from the Project site. Therefore, the model does not assume groundwater is depressed by pumping, nor are there local mounding effects from recharge incorporated (the Sweetwater Percolation Basin is over a mile away and is situated side-gradient).

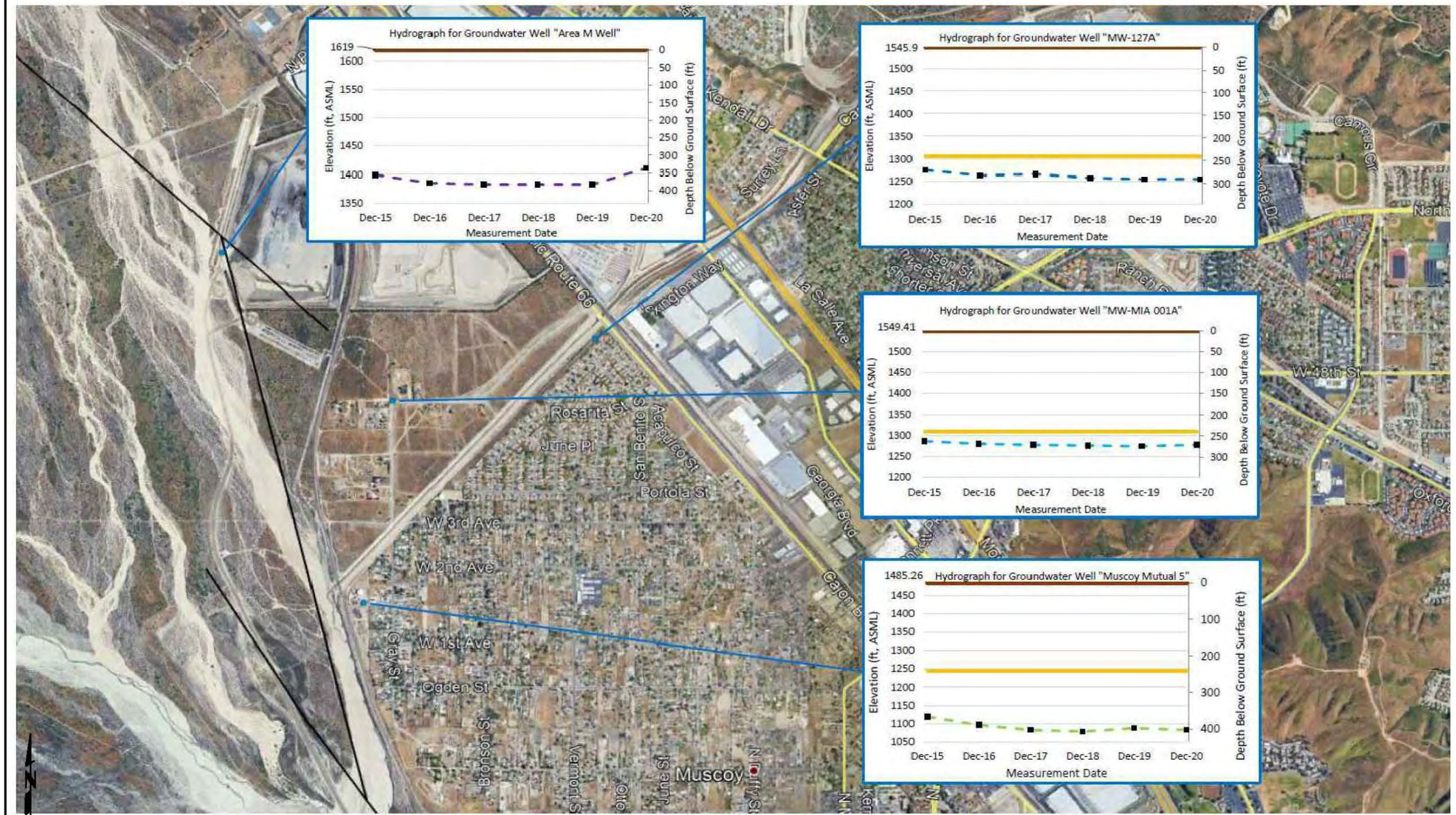
While horizontal flow has changed minimally through time, vertical groundwater movement within the San Bernardino basin has been altered significantly as water production increased, first for agricultural and then for urban uses. Groundwater has been withdrawn from increasingly deeper parts of the valley-fill aquifer, with natural discharge to the land surface having been replaced by discharge to pumping wells (Danskin et al., 2006). Hydraulic head within the aquifer has changed in response, with groundwater levels progressively becoming deeper. Groundwater depths are therefore expected to increase in the Project area through time, which is further evidenced by the increase in aquifer storage capacity of the Bunker Hill Basin, which has a reported accumulated deficit of over 480,000 acre-feet, as compared to the 1993 full-basin storage levels (SBVWCD, 2021). Consequently, even with wet periods groundwater is not expected to reach historic levels previously observed given the extent storage in the aquifer has been reduced, with future groundwater depths to continue to increase.

To refine and evaluate the conceptual model, Sespe reviewed groundwater elevation data for nearby wells, including Vulcan's Area M production well located just west of the fault splay where it contacts the GHF. Additional groundwater level data were obtained and evaluated in relation to the hydraulic barriers from monitoring wells MW-127A, MW-MIA-001A, and Muscoy Mutual 5. As shown on Figure 6, the Muscoy Mutual 5 and MW-MIA-001A wells and are located near the southern side of the Devil Creek, with the later situated close to where the Diversion Channel crosses under Cajon Boulevard. Monitoring well MW-127A occurs onsite within Area M at the intersection of Roadrunner Trail and Gray Street.

Hydrographs for each of the monitoring wells, and the Area M water supply well are provided in Figure 6. By examining the similar period of record (December 2015 through December 2020) captured in each of these hydrographs, fluctuation in water levels observed in wells MW-127A, MW-MIA-001A and Muscoy Mutual 5 generally covary temporally and exhibit more subtle magnitude shifts as compared to the Area M supply well. Given that the conceptual model considers the Lytle Creek Groundwater Basin as a separate groundwater basin the larger groundwater level shifts observed in the Area M well support this model element as the spatially constrained basin geometry and bounding hydraulic barriers in relation to groundwater flow directions would be expected to have a more pronounced effect of the magnitude of change in groundwater elevations. Moreover, because the Area M well locality lie immediately adjacent to the GHF-fault splay contact, which represent a planer inflection oblique to the southerly groundwater flow direction, it is reasonable to interpret these conditions locally amplifying changes in groundwater levels. This concept is further supported by the fact that the Lytle Creek basin has a relatively small storage capacity. In contrast, the regionally extensive Bunker Hill Groundwater Basin is less constrained, as the basin bounding faults that define the basin are much wider and are orientated roughly parallel to the regional groundwater flow direction in the Project Area. Considering these factors, the magnitude of fluctuating groundwater levels in this basin would be expected to be less. Again, this idea is supported by the hydrographs for MW-127A, MIA-MW-001A and the Muscoy Mutual 5 well. Moreover, as previously mentioned, this hydrogeologic investigation include drilling two exploratory borings were advanced at depths to further define site groundwater conditions, and aid in development and validation of the hydrogeologic model discussed below. The groundwater elevations encountered at these borehole locations are shown in Figure 6.

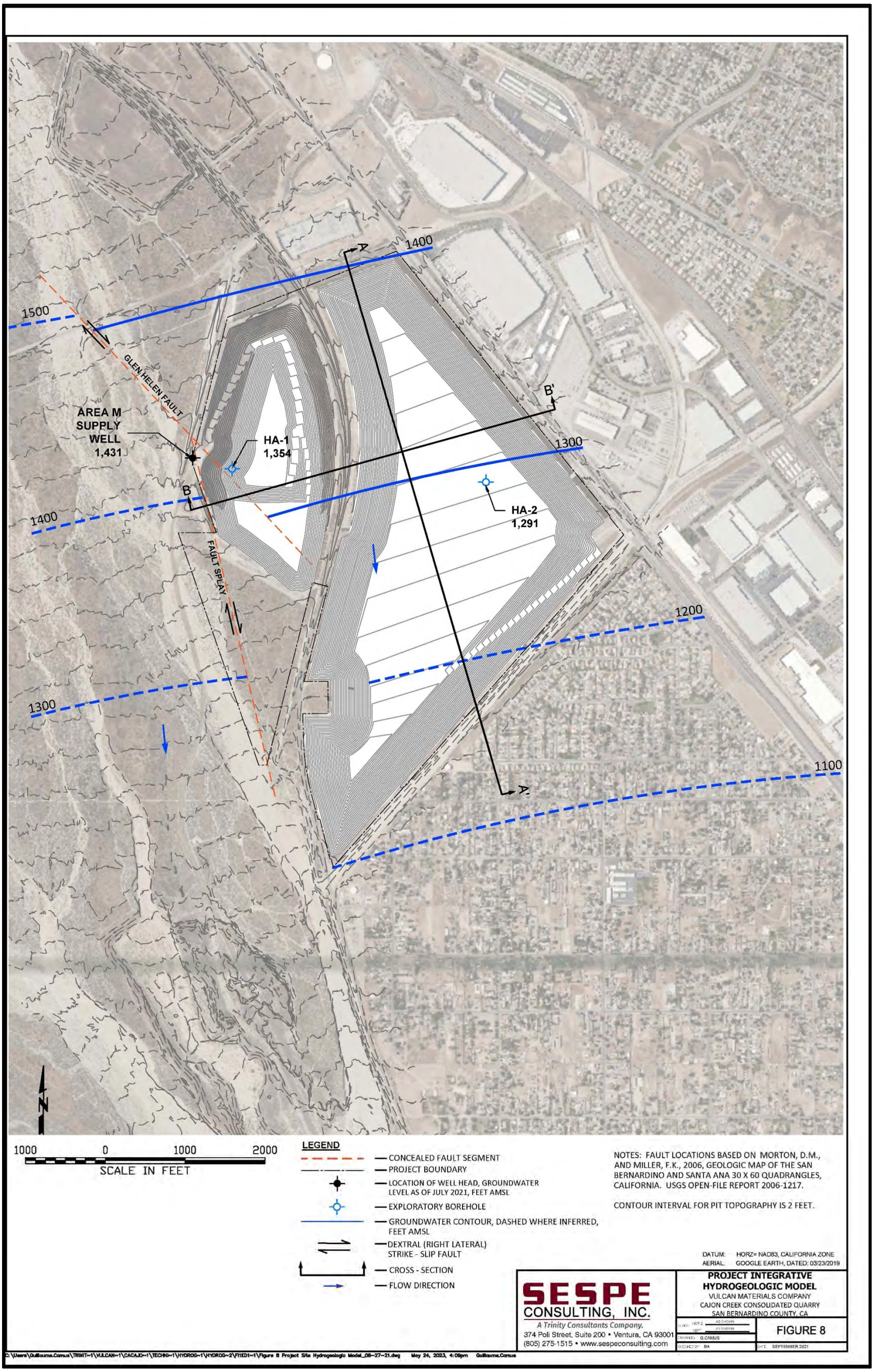
The conceptual hydrogeologic model for the Project site is shown in Figure 8. This model predicts that groundwater underneath the site occurs within two separate basins, each of which are defined by faults that serve as hydraulic barriers. Generally, for the San Bernardino basin alluvial aquifer fluctuations in average depth to groundwater varies from year to year depending, in part, on annual recharge. More specifically, based on information presented in the Upper Santa Ana Integrated Regional Water Management Plan (2015) such changes in groundwater levels are typically less than 20 feet.

With the geometry of these groundwater basins and the locations and orientations of the bounding faults (specifically the GHF and splay), groundwater levels are anticipated to be shallower and susceptible to larger fluctuations in underneath that portion of the Project site west of the hydraulic barriers (within the Lytle Creek Groundwater Basin), whereas groundwater would be deeper to the east underneath the majority of the Project area that overlies the much more extensive Bunker Hill Groundwater Basin. As previously noted, it is inferred that the magnitude of fluctuating groundwater levels would be lower.


Hydrograph for Groundwater Well "Area M Well"
Elevation (ft, ASML)
Depth Below Ground Surface (ft)
Measurement Date
Dec-15
Dec-16
Dec-17
Dec-18
Dec-19
Dec-20
Hydrograph for Groundwater Well "MW-127A"
Hydrograph for Groundwater Well "MW-MIA 001A"
Hydrograph for Groundwater Well "Muscoy Mutual 5"
Approximate Monitoring Well Location
Ground Surface Elevation
Proposed Mining Depth (240' BGS)
Groundwater Surface Elevation (MW-127A)
Groundwater Surface Elevation (Muscoy Mutual 5)
Groundwater Surface Elevation (MW-MIA 001A)
Mapped Faults (Morton and Miller, 2006)
Groundwater Surface Elevation (Area M Well)
Aerial Image Source: Google Earth 2019
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EXISTING GROUNDWATER WELL LOCATIONS AND HYDROGRAPHS
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CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA
FIGURE 6
DRAWN BY: G.CAMUS
CHECKED BY: BA
DATE: SEPTEMBER 2021

bgs


GLEN HELEN FAULT
CAJON BOULEVARD
HA-1
1,354
HA-2
1,291
UNNAMED SPLAY
N
400 0 400 800
SCALE IN FEET
LEGEND
CONCEALED FAULT SEGMENT
PROJECT BOUNDARY
EXPLORATORY BOREHOLE, FEET AMSL
DEXTRAL (RIGHT LATERAL) STRIKE - SLIP FAULT
HA-1 -117.368197 34.176700
HA-2 -117.357677 34.176182
DATUM: HORZ= NAD83, CALIFORNIA ZONE
AERIAL SOURCE: GOOGLE EARTH, DATED: 03/23/2019
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PROJECT EXPLORATORY BOREHOLES AND GROUNDWATER DEPTHS
VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA
FIGURE 7


1400
1500
A
A'
B
B'
GLEN HELEN FAULT
AREA M
SUPPLY
WELL
1,431
HA-1
1,354
HA-2
1,291
1300
1400
1200
1300
1100
FAULT SPLAY
N
1000 0 1000 2000
SCALE IN FEET
LEGEND
CONCEALED FAULT SEGMENT
PROJECT BOUNDARY
LOCATION OF WELL HEAD, GROUNDWATER LEVEL AS OF JULY 2021, FEET AMSL
EXPLORATORY BOREHOLE
GROUNDWATER CONTOUR, DASHED WHERE INFERRED, FEET AMSL
DEXTRAL (RIGHT LATERAL) STRIKE - SLIP FAULT
CROSS - SECTION
FLOW DIRECTION
NOTES: FAULT LOCATIONS BASED ON MORTON, D.M., AND MILLER, F.K., 2006, GEOLOGIC MAP OF THE SAN BERNARDINO AND SANTA ANA 30 X 60 QUADRANGLES, CALIFORNIA. USGS OPEN-FILE REPORT 2006-1217.
CONTOUR INTERVAL FOR PIT TOPOGRAPHY IS 2 FEET.
DATUM: HORZ= NAD83, CALIFORNIA ZONE
AERIAL: GOOGLE EARTH, DATED: 03/23/2019
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PROJECT INTEGRATIVE HYDROGEOLOGIC MODEL
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CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA
FIGURE 8
DRAWN: G.CANUS
CHECKED: BA
DATE: SEPTEMBER 2021
C:\Users\Guillaume.Canus\TRINIT~1\VULCAN~1\CACAJO~1\TECHNI~1\HYDROG~1\HYDROG~2\FIGED1~1\Figure 8 Project Site Hydrogeologic Model_08-27-21.dwg May 24, 2023, 4:09pm Guillaume.Canus

3.3 Model Validation

To test and validate the conceptual hydrogeologic model, Sespe collaborated with Vulcan and its geotechnical consultant to design and implement a drilling campaign, with the objective to collect lithologic and hydrogeologic information directly underneath the site. The drilling program involved advancing a series of boreholes at select locations in Areas M, L and Q to collect information about the nature and type of alluvial facies and depth to groundwater in relation to the modeled hydraulic barriers (geologic faults).

The drilling campaign utilized a sonic drill rig to complete exploratory boreholes for Standard Penetration Testing (SPT) in support of the Project geotechnical analysis, lithologic logging and confirmation of groundwater depth. For determining the depth to groundwater, two exploratory boreholes (designated HA-1 and HA-2) were advanced until reaching groundwater (refer back to Figure 6). Boring logs for each of the two exploratory boreholes, as well as the other borings are provided as Appendix A. The HA-1 borehole was located immediately east of the GHF and slightly south of the splay contact. In addition to using this location to measure depth near the faults, this position was selected since it lies within the calculated Area M radius of influence, and thus could be used to evaluate the hydraulic effect of the GHF/splay. That is, under Area M well non-pumping conditions if there were sufficient conductivity across the plane of the faults, groundwater levels at this location would be expected to rise. Because of the lack of existing groundwater information in the northeasterly portion of the Project site, the HA-2 borehole locality was chosen to drill to groundwater so that depth could be measured. Take together, these two groundwater data points were used with the information for the Area M well to test and validate the conceptual hydrogeologic model and interpret groundwater flow conditions on either side of the faults.

The HA-2 exploratory borehole was advanced prior to HA-1, and encountered generally fine- to coarse-grained alluvial facies, consistent with the depositional setting for this part of the San Bernardino basin. This collar location sits inside the southeastern portion of the existing Area L pit, where groundwater was encountered at 163 feet bgs, or 1,291 feet above mean seal level (amsl). By comparison, this elevation is 140 feet lower than the reported July 2021 static water level for the Area M supply well (approximately 1,431 amsl), west of the GHF and fault splay. Similarly, borehole HA-1 located due east of the Area M well encountered groundwater at an elevation of approximately 1,354 feet amsl, or 77 feet deeper than the groundwater level measured July 2021 from the Area M well. The extent of observed offsets in groundwater elevations across the GHF and related splay are consistent with the modeled hydraulic discontinuities associated with the GHF and Barrier F (Danskin et al., 2006; Hardt and Hutchinson, 1980). These barrier effects are attributed to the marked difference in hydraulic conductivities between the alluvium and the faults. According to Danskin et al. (2006), the basin fill alluvium within the Project area consists of older continental, fluvial deposits up to 800 feet in thickness, younger alluvium about 100-foot thick, characterized as primarily flood-plain deposits, and thin river-channel deposits. These types of alluvial assemblages commonly exhibit relatively high hydraulic conductivities. As previously noted, Dutcher and Garrett (1963) reported hydraulic conductivity for these deposits ranging from about 40 to 100 feet per day. Thus, the alluvial aquifer readily permits intra-basin groundwater movement. In contrast, the observed differences in groundwater depths faults across the GHF and splay are consistent with the predicted hydraulic effects of these structures. Moreover, these hydraulic barriers are accounted for in a corroborating numeric model developed for the Bunker Hill Groundwater Basin (LeFrancois, 2006).

3.4 Projected Groundwater Levels

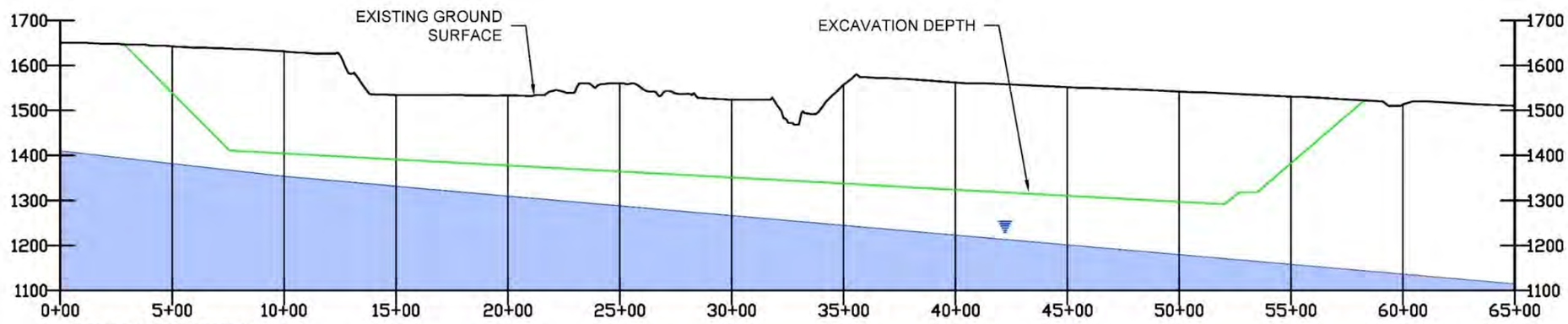
When considering the hydraulic barrier effects discussed above and observed groundwater levels, the proposed pit depth of 240 feet below native ground surface is at least 23 feet above the groundwater elevations underneath the Project site. However, it is important to consider and assess fluctuations in groundwater levels through time, in relation to the designed pit depth. Oftentimes, the methodology employed to evaluate the potential future impact associated with changing groundwater levels is to review historical groundwater elevation data for nearby wells, and rely on that information as a means to forecast the potential theoretical groundwater high. While this approach may be appropriate for gauging the general range of basin-wide fluctuations (for example, the 2015 Upper Santa Ana River Watershed Integrated Regional Groundwater Management Plan [IRWMP] estimates the typical fluctuation in groundwater levels across the Bunker Hill Basin is plus/minus 20 feet, with a basin-wide maximum of 40 feet), inconsistencies in the time-series among well records can result in biasing of estimated groundwater elevations, and consequentially the approximation in the range of fluctuations. According to Blickenstaff et al. (2013), this bias occurs due to differences in the period of record of wells within a given basin if the basin average for different months is based on a different sub-set of wells, and each well has a different mean groundwater elevation, then the resulting average reflects variations in the sub-set of well used. Thus, the historic record of groundwater elevations at basin-wide scale, or even an individual well, may not be an accurate indicator as to future water levels at a single locus. Moreover, in order to evaluate basin-scale groundwater conditions, not only do groundwater basin inflow and outflow parameters need to be accounted for and reasonably quantified to forecast groundwater conditions, but the dynamical effects of climate change must be taken into account.

To address the causal relationship on climate change, notably the impact on groundwater levels in the Project area, the US Department of Interior, Bureau of Reclamation prepared a comprehensive climate change analysis for the Santa Ana River Watershed (Blickenstaff et al., 2013). This analysis included the development and integration of a multi-variate screening tool that accounts for water availability (precipitation, local streamflow, and trans-basin imports), water demand (municipal and industrial demand, agricultural land use [irrigated acreage], and evaporative demand), as well as an optional exogenous input that represents groundwater management objectives that can influence overall groundwater levels. With this screening tool, the analysis developed model inputs to forecast changes in groundwater levels throughout the watershed, which was subdivided into discrete groundwater basins.

Included in the Bureau of Reclamation analysis is an assessment of the overall predicted climate change affects to the watershed, which includes a decrease in precipitation and increases temperature, resulting in a decrease in natural recharge throughout the basin. As such, in the absence of groundwater management actions groundwater levels are projected to decline significantly over the 21st century (Blickenstaff et al., 2021). Further, the study report notes that the projected declines are not constrained by the physical limits of the aquifer; and suggests the projected declines may exceed the actual amount of usable groundwater in the basin. Based on the Bureau of Reclamation analysis, it is clear that given the current and long-term effects of climate change of the hydrologic regime of the groundwater basin, historical data for an individual well or at a basin-wide scale do not offer a reliable proxy in which to assess future changes in groundwater levels.

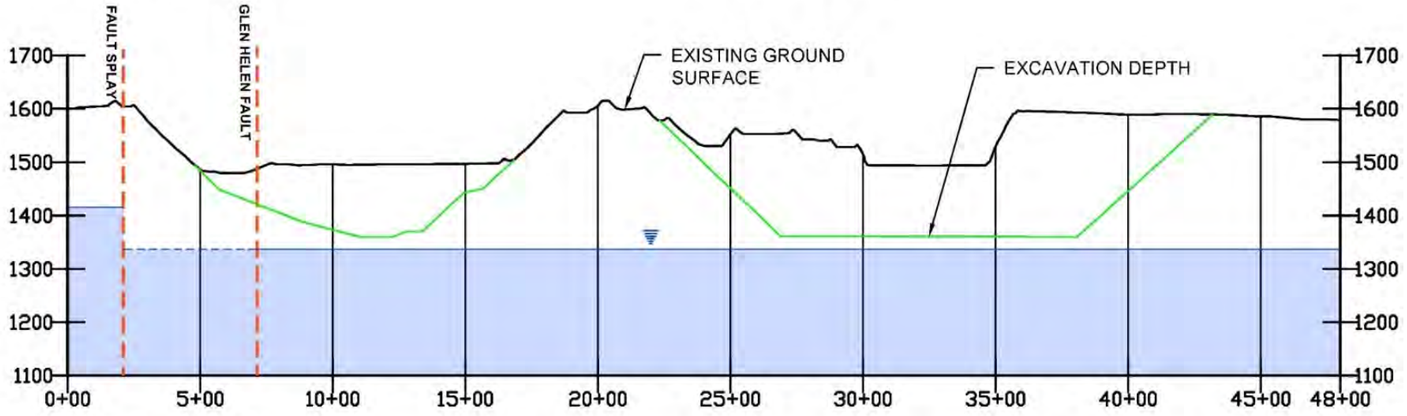
With regard to this hydrogeologic study, of particular interest are the model output results for the Upper Santa Ana Valley Groundwater Basin (USAVGB), which includes the Bunker Hill and Lytle Creek basins. For the USAVGB, the Bureau of Reclamation analysis forecasts groundwater elevations over the period 1990-2100, which are presented graphically in Figure 10 (Blickenstaff et al., 2013). As demonstrated from the analysis and shown on the graph, barring any changes in water management strategies at mitigating declining levels, the results forecast continued decline of groundwater levels over the life of the Project. By comparison, the observed and modeled groundwater elevations correlate well, such that the projected levels may be considered a representative indicator of future groundwater conditions.

As previously mentioned, when considering the conceptual model, the site-specific groundwater data not only corroborate the existing groundwater levels reported for the nearby monitoring wells, but also align well with hydraulic effects of the faults. With the hydrogeologic model established for the site, it is our opinion the design pit depths for the Project are viable both under short-and long-term conditions, particularly given the modeled predicted decline in groundwater levels. That is, the results of this investigation demonstrate that the observed groundwater depths measured as part of the Project's drilling campaign are anticipated to decrease below present levels, and well-beyond the range of typical fluctuations quantified in the IRWMP. The Project's designed pit depth therefore is not expected to result in inundation by exposed groundwater, and consequential loss by sustained evaporative loss. This conclusion is further supported by the proposed business plan for the Project site, which includes import recycle and clean fill operations. The placement of clean fill over the course of the mining and processing operations will raise portions of the in-pit grade, and thus will increase the areas of final floor elevation in combined Areas K, L and Q, as well as in the Area M and N pits. Thus, the unsaturated profile will be sufficiently expanded, thereby precluding groundwater exposure even if water levels were to rise within the range of predicted fluctuations.



SCALE (APPROXIMATE):
HORZ: 1" = 500'
VERT: 1" = 250'

SECTION A - A'



SCALE (APPROXIMATE):
HORZ: 1" = 500'
VERT: 1" = 250'

SECTION B - B'

NOTES: EXISTING SURFACE TOPOGRAPHY BASED ON: 2021 SURVEY.
ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL.
EXCAVATION DEPTH AT 240 FEET BELOW NATIVE GROUND SURFACE

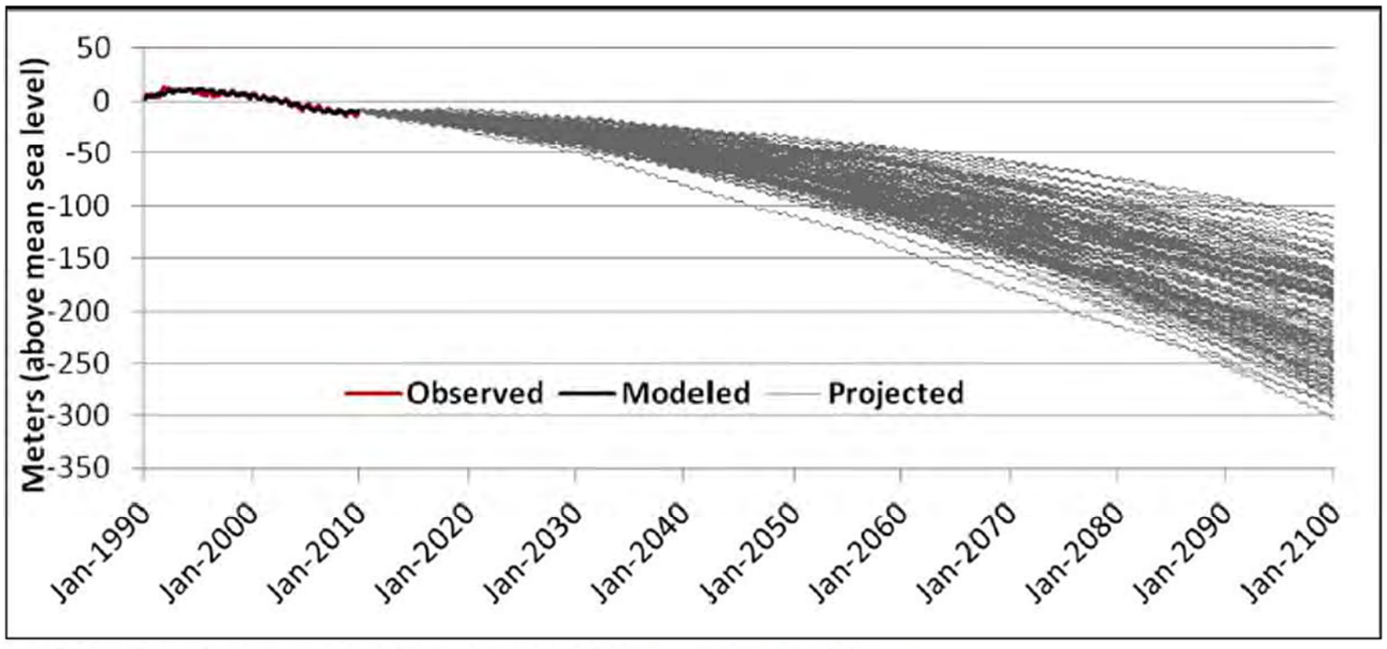
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HYDROGEOLOGIC MODEL
CROSS - SECTIONS
VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA 92407

FIGURE 9

DRAWN BY: G.CAMUS
CHECKED BY: BA
DATE: SEPTEMBER 2021

C:\Users\Guillcume.Camus\Trinity Consultants, Inc\Vulcan – Documents\CA Cajon Creek\Technical Memorandum\Hydrogeologic Study\Hydrogeologic Report Figures\Figure 9 Hydrogeologic Model Cross-Sections\Figure 9 Hydrogeologic Model Cross-Sections_09-27-21.dwg May 24, 2023, 4:16pm Guillcume.Camus



SOURCE FROM: BLICKENSTAFF, K., GANGOPADHYAY, S., FERGUSON I., CONDON, L., AND PRUITT, T., 2013. CLIMATE CHANGE ANALYSIS FOR THE SANTA ANA RIVER WATERSHED, TECHNICAL MEMORANDUM NO. 1, SANTA ANA WATERSHED BASIN STUDY, CALIFORNIA, LOWER COLORADO REGION. UNITED STATES DEPARTMENT OF INTERIOR, BUREAU OF RECLAMATION, WATER AND ENVIRONMENTAL RESOURCES DIVISION.

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PROJECTED CHANGE IN GROUNDWATER LEVELS, YEARS 1990-2100 FOR THE UPPER SANTA ANA RIVER WATERSHED
CAJON CREEK CONSOLIDATED QUARRY
SAN BERNARDINO COUNTY, CA

FIGURE 10

S:\Vulcan\Cajon Creek Phase II Project\Hydrogeologic Study\Hydrogeologic Report Figures\Figure 10 Projected Change In Groundwater Levels, Years 1990-2100\Figure 10- Projected Change In Groundwater Levels-Years 1990-2100.dwg Sep 03, 2021, 9:11am GJC

4.0 CONCLUSIONS

To evaluate the proposed Cajon Creek Consolidated Quarry Project with respect to groundwater conditions and future groundwater levels, this hydrogeologic investigation was performed to determine if the proposed design pit depth of 240 feet bgs could be achieved without encountering groundwater, or presenting conditions subject to potential future inundation. For this investigation, a comprehensive review of existing groundwater information pertinent to the Project area was used to prepare a conceptual hydrogeologic model, which describes groundwater conditions within the underlying geologic framework. This model was then tested and refined based on site-specific groundwater data collected as part of a geotechnical study. The study included advancing two exploratory boreholes in Areas L and M to delineate groundwater conditions in relation to know hydraulic barriers (faults) mapped within and along the western edge of the Project site. Based on the hydrogeologic model for the Project site, groundwater is estimated at greater than 260 feet bgs, which is more than 20 feet below the design pit depth.

To assess whether the Project could result in sustained groundwater exposure from future changes in groundwater conditions, predictive models were examined and assess to identify the range of typical basin-scale fluctuations and forecasted long-term trends. Existing well data and basin inflow/outflow parameters indicate that fluctuations in groundwater levels underlying the Project area are typically plus/minus 20 feet. However, while this variation range may hold true for future groundwater level variations at the basin scale, there are multiple models for the San Bernardino area basin that corroborate continued declining groundwater elevations. For example, baseline and model run layers through year 2036 for the San Bernardino basin indicates groundwater levels are expected to become deeper, and notably within those portions of the upper aquifer underlying the Project area (Geoscience Support Services, 2009). Likewise, taking into account the effects of climate change, levels are projected to decline over the life of the Project, based on a detailed and comprehensive analytical model prepared by the US Department of Interior, Bureau of Reclamation (2013). Important and relevant to this Project, the Bureau of Reclamation analysis demonstrates that precipitation will continue to decrease while atmospheric temperature increases, resulting in a decrease in natural recharge to the aquifer. Therefore, groundwater depths across the basin are expected to further increase in the Project area, and as such exposure of groundwater by sustained inundation in mining pits and consequential loss by evaporation is not anticipated. In addition, the quarry operations will include placement on in-pit fill materials over these portions over the life of the mine. As such, portions of the final in-pit grade will be raised, resulting in an increase in the vertical profile of the unsaturated zone. Based on the findings of this hydrogeologic investigation the proposed extension of mining to 240 feet bgs is not expected to have any new impact to the aquifer underlying the Project site, specifically as it relates to groundwater exposure, or potential future sustained inundation resulting from fluctuations in groundwater levels.

5.0 REFERENCES

Blickenstaff, K., Gangopadhyay, S., Ferguson I., Condon, L., and Pruitt, T., 2013. Climate Change Analysis for the Santa Ana River Watershed, Technical Memorandum No. 1, Santa Ana Watershed Basin Study, California, Lower Colorado Region. United States Department of Interior, Bureau of Reclamation, Water and Environmental Resources Division, 99 p.

Danskin, W. R., McPherson, K. R., and Woolfenden, L. R., 2006. Hydrology, Description of Computer Models, and Evaluation of Selected Water- Management Alternatives in the San Bernardino Area, California. U.S. Geological Survey Open-File Report 2005-1278, 178 p.

Dutcher, L. C. and Fenzel, F. W., 1972. Hydrology, Description of Computer Models, and Evaluation of Selected Water-Management Alternatives in the San Bernardino Area, California.

Dutcher, L. C., and Garrett, 1963. Geologic and Hydrologic Features of the San Bernardino Area, California, with Special Reference to Underflow Across the San Jacinto Faults. USGS Water Supply Paper No. 1419, 114 p.

Geoscience Support Services, Inc., 2009. San Bernardino Basin Area, Refined Basin Flow Model and Solute Transport Model Report, 319 p.

Hardt, W. F., and Hutchinson, C. B., 1980. Development and Use of a Mathematical Model of the San Bernardino Valley Ground-Water Basin, California. USGS Water-Resources Investigations Open-File Report 80-576, 80 p.

LeFrancois, M., 2006. Estimating Source Term for Ground-Water Contamination, Master of Science Thesis, Colorado School of Mines, 236 p.

Miller, F. K., and Matti, J. C., 2001. Geologic map of the San Bernardino North 7.5’ quadrangle, San Bernardino County , California. USGS Open-File Report OF 01-131.

Morton, D. M., and Miller, F. K., 2006. Geologic map of the San Bernardino and Santa Ana 30’ by 60’ quadrangles, California. USGS Open-File Report 2006-1217.

San Bernardino Valley Water Conservation District, 2021. Engineering Investigation of the Bunker Hill Basin, 2019-2020, 29 p.

Upper Santa Ana River Watershed Integrated Regional Groundwater Management Plan, 2021. San Bernardino Valley Water Conservation District, 178 p.

URS, 1993. Remedial Investigation/Feasibility Study Report for Newmark RI/FS Groundwater Contamination Project.

Appendix A

Exploratory Boring Logs for HA-1 and HA-2 (2021)

GEOTECHNICAL TEST BORING REPORT

Boring No. HA-1 / SB-21-6

Project	Cajon Creek Quarry Phase II Expansion, San Bernadino, California
Client	Vulcan Materials Company
Contractor	Yellow Jacket Drilling Services, LLC

		Drilling Equipment and Procedures
Boring Diameter (in.)	6.0	Rig Make & Model: Sonic
Hammer Type	Automatic Hammer	Bit Type:
Hammer Weight (lb)		Drill Mud: None
Hammer Fall (in.)		Casing: Sonic
		Hoist/Hammer: /Automatic Hammer
		PID Make & Model:

File No.	0132051-005
Sheet No.	1 of 5
Start	June 29, 2021
Finish	July 1, 2021
Driller	Carlos
H&A Rep.	J. Vanderwal
Elevation Datum	1497.0
Location	See Plan

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
0						SM	Light brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel, few non plastic fines, trace coarse gravel, micas				1495
							Rock flour				
5						SM	Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand to fine gravel, few coarse gravel, trace non plastic fines, micas				1490
							Coarsens down sequence				
10						SM	Dark brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel, few non plastic fines, micas				1485
						SM	Gray brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few non plastic fines, micas				
15					1482.0 / 15.0	SP	Light brown, poorly graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, little coarse gravel				1480
							Rig chatter				
					1479.0 / 18.0	SM	Brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, little non plastic fines, micas				
20						SM	Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse and fine gravel, trace coarse gravel, trace non plastic fines, micas				
					1475.0 / 22.0	SP	Light brown, poorly graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, few coarse gravel, trace non plastic fines, micas				1475
							Rig chatter				
25							Rock flour				
					1470.0 / 27.0	SM	Yellow brown, silty SAND with gravel, moist, mostly fine to medium sand, little coarse sand, few fine gravel, few non plastic fines, micas				1470
30											

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
6/30/2021	18:30	-	150	150	143
7/1/2021	07:30	-	150	150	143.5

Sampler Type Legend

SPT - Standard Penetration Test
MCS - Modified California Sampler (2.43-in ID)

Summary

Overburden (ft)	175
Rock Cored (ft)	
Samples	16

Boring No. HA-1 / SB-21-6

Field Tests:

Dilatancy : R - Rapid S - Slow N - None
Toughness : L - Low M - Medium H - High
Plasticity : N - Nonplastic L - Low M - Medium H - High
Dry Strength : N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Aug 12, 21
\\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB.GPJ
PLOG-H&A.GDT
132051_PLOG-HA-LIB09.GLB
H&A BORING MDH SAMPLE

GEOTECHNICAL TEST BORING REPORT

Boring No. HA-1 / SB-21-6
File No. 0132051-005
Sheet No. 2 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
30						SM	Coarsens down sequence Trace gravel up to 2 in.				1465
						SM	Gray brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand and fine gravel, trace coarse gravel, little non plastic fines, micas				
35					1459.5						1460
					37.5	SW	Yellow brown, well graded SAND, moist, mostly fine to medium sand, few coarse sand, mica				
					1458.5 38.5	SP	Brown, poorly graded SAND with gravel, moist, mostly fine to medium sand, some coarse sand and fine gravel, trace coarse gravel, trace non plastic fines, micas				
40					1456.0		Gravel up to 2 in.				
					41.0	SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, little coarse sand, few fine gravel, trace coarse gravel, trace non plastic fines, micas				1455
							Rig chatter				
					1452.5		Rock flour				
45					44.5	SP	Yellowish brown, poorly graded SAND with gravel, mostly fine to coarse sand, little fine gravel, trace coarse gravel, trace non plastic fines				
							Rig chatter				1450
							Gravel up to 3 in.				
50							Coarsens down sequence				1445
55						SP	Yellowish brown, poorly graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, few coarse gravel, trace non plastic fines, micas				
					1440.5						
					56.5	SM	Brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel and non plastic fines, micas				1440
60											
						SM	Gray brown, silty SAND with gravel, moist, mostly fine to coarse sand, little fine to coarse gravel, trace non plastic fines, gravel up to 2 in., micas				1435
					1434.5 62.5	SW	Rig chatter				
					1433.5 63.5	SM	Yellowish brown, well graded SAND, moist, mostly fine to medium sand, little coarse sand, micas				
65							Brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel, little plastic fines, micas				1430
							Coarsens down sequence				
70							Iron oxide staining				1425
						SM	Gray brown, silty SAND, moist, mostly fine to medium sand, some coarse sand and fine gravel, few coarse gravel, few non plastic fines, micas				

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-1 / SB-21-6

H&A BORING MDH SAMPLE 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB.GPJ Aug 12, 21

GEOTECHNICAL TEST BORING REPORT

Boring No. HA-1 / SB-21-6
File No. 0132051-005
Sheet No. 3 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
75					1421.0 / 76.0	SP	Yellowish-brown, poorly graded SAND, moist, mostly fine to medium sand, micas				1420
					1419.5 / 77.5	SP-SM	Light brown, poorly graded SAND, moist, mostly fine to medium sand, little coarse sand, few fine gravel, trace coarse gravel, few non plastic fines, mica				
					1417.5 / 79.5	CL	2-in. thick CLAY lens				
80					1417.0 / 80.0	SM	Dark brown, silty SAND, moist, mostly very fine to medium sand, little coarse sand, few fine gravel, few non plastic fines, micas				1415
							Coarsens down sequence				
85					1411.0 / 86.0	SP	Gray brown, poorly graded SAND with gravel, moist, mostly fine to medium sand, little coarse sand, little fine gravel, micas				1410
					1408.0 / 89.0	SM	Light brown, silty SAND with gravel, moist, micas, gravel 19%, sand 66%, fines 15%				
90	SPT	HA-1-90-91.5	4	50/4"					4.5	15.0	1405
							Trace coarse gravel up to 2 in.				
							Coarsens down sequence				
95	SPT	HA-1-95-96.5	5	50/5"		SM	Brown, silty SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, non plastic fines, trace coarse gravel up to 2 in., micas		3.6	19.1	1400
							Rig chatter				
						SM	Brown, silty SAND, moist, mostly fine to medium sand, some coarse sand, few fine gravel. few non plastic fines, micas				
100	SPT	HA-1-100-101.5	4	50/4"			Rock flour				1395
						SM	Brown, silty SAND, moist, fine to coarse sand, fine gravel, non plastic fines, micas, gravel 13%, sand 55%, fines 32%		4.3	32.0	
							Rig chatter				
							Coarsens down sequence				
105					1391.5 / 105.5	SW	Gray brown, well graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, few non plastic fines, few coarse gravel, micas				1390
							Trace coarse gravel up to 2 in.				
110	SPT	HA-1-110-111.5	5	50/5"	1387.0 / 110.0	SW-SM	Brown, well graded SAND with silt, moist, moistly fine to medium sand, some coarse sand, few fine gravel, non plastic fines, micas		2.8	10.4	1385
					1384.5 / 112.5	SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, little fine gravel, few non plastic fines, micas				
115						SM	Gray brown, silty SAND, moist, mostly fine to medium sand, little coarse sand, little non plastic fines, micas				
					1381.0 / 116.0	SP	Poorly graded SAND with gravel, moist, mostly fine to medium sand, some coarse sand, few fine gravel, trace non plastic fines, micas Trace coarse gravel up to 2 in.				1380

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-1 / SB-21-6

H&A BORING MDH SAMPLE 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB.GPJ Aug 12, 21

GEOTECHNICAL TEST BORING REPORT

Boring No. HA-1 / SB-21-6
File No. 0132051-005
Sheet No. 4 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
					1377.0						
120	SPT	HA-1-120-121.5	4	50/4"	120.0	SM	Dark brown, silty SAND, moist, mostly fine to coarse sand, few non plastic fines, fine gravel, micas, gravel 15%, sand 67%, fines 18% Rig chatter Trace coarse gravel up to 2 in., rock flour		3.9	18.0	1375
							Fine gravel, increases down sequence				
125						SM	Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, few fine gravel, few non plastic fines, micas				1370
130	SPT	HA-1-130-131.5	4	50/4"		SM	Fines 16%		7.0	16.3	
						SM	Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, little fine to coarse gravel, trace non plastic fines, micas				1365
135							2-in. non plastic fines lens				
					1360.5						
					136.5	SP	Poorly graded SAND, moist, mostly fine to medium sand, little coarse sand, trace non plastic fines, micas				1360
					1359.0						
					138.0	SW	Well graded SAND with gravel, moist, mostly fine to coarse sand, little fine gravel, trace non plastic fines, micas				
					1357.0						
140	SPT	HA-1-140-141.5	4	50/4"	140.0	SM	Yellowish brown, silty SAND, moist to wet, mostly fine to coarse sand, non plastic fines, fine gravel, micas, gravel 11%, sand 65%, fines 24%		3.6	24.0	1355
							Groundwater at 143 ft				
					1352.5						
145					144.5	ML	Gray brown, sandy SILT, wet, mostly non plastic fines, some fine sand, few medium to coarse sand, micas				
					1351.0						
					146.0	SP	Dark brown, poorly graded SAND, wet, mostly medium to coarse sand, little fine sand, few fine gravel, micas				1350
					1347.0						
150	SPT	HA-1-150-151.5	12	37 50/6"	150.0	SP-SM	Gray brown, poorly graded SAND with silt, wet, medium dense, mostly fine to medium sand, some coarse sand, non plastic fines, micas		10.6	11.2	
							Trace coarse gravel up to 2 in. Dark brown				1345
					1343.0						
					154.0	SM	Gray brown, silty SAND, wet, medium dense, mostly fine to medium sand, some coarse sand, few fine gravel, little non plastic fines				
155						SM	Trace coarse gravel up to 2 in. Dark brown, silty SAND, wet, mostly fine to coarse sand, little fine to coarse gravel, little non plastic fines				1340
					1337.0						
160	SPT	HA-1-160-161.5	16	6 5 50/4"	160.0	SP-SM	Dark brown, poorly graded SAND with silt, wet, mostly fine to medium sand, few coarse sand, non plastic fines, trace fine gravel		11.4	7.4	
						SP-SM	Yellowish brown, poorly graded SAND with silt, wet, mostly fine to coarse sand, few fine gravel, few non plastic fines, trace cobbles				1335
					1333.5						
					163.5						

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-1 / SB-21-6

H&A BORING MDH SAMPLE 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB.GPJ Aug 12, 21

GEOTECHNICAL TEST BORING REPORT

Boring No. HA-1 / SB-21-6
File No. 0132051-005
Sheet No. 5 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
165					1331.0	SM	Brown, silty SAND, wet, mostly fine to medium sand, little coarse sand, little non plastic fines, trace fine gravel				
					166.0	SP-SM	Dark brown, poorly graded SAND with silt, wet, mostly fine to medium sand, little coarse sand, few fine to coarse gravel, few non plastic fines, micas Rig chatter Trace coarse gravel up to 2 in.				1330
170	SPT	HA-1-170-171.5	18	3 2 10	1326.0 171.0	SM	Brown, silty SAND, wet, mostly fine to medium sand, few coarse sand, non plastic fines, fine gravel, micas, gravel 2%, sand 85%, fines 13% Rig chatter, hard drilling		17.0	13.0	
						SM	Yellowish brown, silty SAND, wet, mostly fine to medium sand, some coarse sand, few non plastic fines, trace fine gravel				1325
175					1321.5 175.5	SP-SM	Poorly graded SAND with silt, wet, mostly fine to coarse sand, little fine gravel, trace coarse gravel, trace non plastic fines, micas				1320
180	SPT	HA-1-180-181.5	3	50/3"	1317.0 180.0		BOTTOM OF EXPLORATION 180.0 FT Note: Groundwater at 143.0 ft.				1315
185											1310
190											1305
195											1300
200											1295
205											1290

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-1 / SB-21-6

H&A BORING MDH SAMPLE 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB.GPJ Aug 12, 21

GEOTECHNICAL TEST BORING REPORT

Boring No. HA-2 / SB-21-5

Project	Cajon Creek Quarry Phase II Expansion, San Bernadino, California
Client	Vulcan Materials Company
Contractor	Yellow Jacket Drilling Services, LLC

		Drilling Equipment and Procedures
Boring Diameter (in.)	6.0	Rig Make & Model: Sonic
Hammer Type	Automatic Hammer	Bit Type:
Hammer Weight (lb)		Drill Mud: None
Hammer Fall (in.)		Casing: Sonic
		Hoist/Hammer: /Automatic Hammer
		PID Make & Model:

File No.	0132051-005
Sheet No.	1 of 5
Start	June 16, 2021
Finish	June 23, 2021
Driller	Carlos
H&A Rep.	K. Neill
Elevation Datum	1454.0
Location	See Plan

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
0						SM	Note: Logged by Vulcan from 0 to 85 ft. Silty SAND with gravel, gravel 2 in., flat to oblate, schist, fine to coarse sand, quartz rich/granitic sand, estimated gradation: sand 50%, silt 15%, gravel 35% Gravel 25=30%, MPS 5 in. (1-3%)				
							Rock flour				1450
5							Rock flour 5 in. 10YR 5/2				
							Gravels 10-15%, MPS 2 in., mostly 0.75 in.				1445
10							4 in.				
											1440
15							Rock flour				
											1435
20							Rock flour 3 in.				
						SM	Silty SAND with gravel, fine gravels to 0.5 in., fine to coarse sand, weak induration, estimated gradation: sand 75%, silt 15%, gravel 10%				1430
25							Slight increase in gravel 15-20% 4"				
							Slight increase in silt 20-25%, very fine to medium sand, weak induration				1425
30											

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
6/17/2021	-	-	175	175	163

Sampler Type Legend

SPT - Standard Penetration Test
MCS - Modified California Sampler (2.43-in ID)

Summary

Overburden (ft)	175
Rock Cored (ft)	
Samples	16

Boring No. HA-2 / SB-21-5

Field Tests:

Dilatancy : R - Rapid S - Slow N - None
Toughness : L - Low M - Medium H - High
Plasticity : N - Nonplastic L - Low M - Medium H - High
Dry Strength : N - None L - Low M - Medium H - High V - Very High

***Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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GEOTECHNICAL TEST BORING REPORT

Boring No. HA-2 / SB-21-5
File No. 0132051-005
Sheet No. 2 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
30											
							Slight increase in silt, estimated gradation: sand 70%, silt 20%, gravel 10%				1420
35											
							Decomposed schist?				1415
40							Decomposed granite				
							Slight increase in gravels 10-15%, MPS 2 in., weak induration				1410
45											
											1405
50							Weak induration, ~1 in. thick silt/sand, estimated gradation: sand 70%, silt 20%, gravel 10%				
							Decreasing coarse sand, very fine to coarse sand				1400
55											
											1395
60											
							Slight increase in gravel				1390
65											
							10YR 4/2				1385
70							Fine to coarse sand Slight increase in gravels to 10-15%, TE 2 in. Fine to coarse sand, quartz and granitic sand, rock flour, 3 in.				
											1380

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-2 / SB-21-5

H&A BORING MDH SAMPLE 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB.GPJ Aug 12, 21

GEOTECHNICAL TEST BORING REPORT

Boring No. HA-2 / SB-21-5
File No. 0132051-005
Sheet No. 3 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
75											
							Rock flour				1375
80							Increasing gravel to 15-20%				
							Severely weathered schist				1370
					1369.0						
85	SPT	HA-2-85-86.5	5	50/5"	85.0	SC	Note: Logged by Haley & Aldrich starting at 85.0 feet. Brown, clayey SAND, moist, medium dense, mostly fine to medium sand, plastic fines, few coarse sand, fine gravel (subrounded to rounded), granitic, micas, gravel 2%, sand 56%, fines 42%		9.3	42.0	
							Coarsens down sequence				
							Rock flour, hard drilling Increase in gravels				1365
					1364.0						
90	SPT	HA-2-90-91.5	4	50/4"	90.0 1363.0	SM	Rock flour		6.1	24.7	
					91.0	SC	Gravel lens - 4-in. thick Dark brown, clayey SAND, moist, dense, mostly fine to medium sand, plastic fines, few coarse sand, micas				
					1361.0						
					93.0	SM	Yellowish brown, silty SAND with gravel, moist, dense, mostly fine to medium sand, little fines and coarse sand, little gravels, subangular to angular, gravel lens				1360
95	SPT	HA-2-95-96.5	2	50/2"		SM	Gravel 18%, sand 56%, fines 26%		3.3	26.0	
							Rock flour				
							Coarsens down sequence				
							Rock flour and gravels				1355
100	SPT	HA-2-100-101.5	3	50/3"		SM	Dark yellowish brown, silty SAND with gravel, moist, dense, mostly fine to coarse sand, little fine to coarse gravels, mica		4.1	25.7	
							Fines down sequence, less gravels				
						SM	Gradational contact Yellowish brown, silty SAND, moist, dense, mostly fine to medium sand, little non plastic fines, few coarse sand, few fine gravel, micas				1350
105	SPT	HA-2-105-106.5	4	50/4"		SM	Rock flour and lens of gravel ~4-in. thick Dark yellowish brown, silty SAND, moist, mostly fine to medium sand, non plastic fines, few coarse sand and gravel, micas, gravel 12%, sand 58%, fines 40%		4.3	40.0	
							Coarsens down sequence				
					1346.0						
					108.0	SP	Brownish yellow, poorly graded SAND with gravel, moist, mostly fine to medium sand, some coarse sand, little fine gravel, trace coarse gravel				1345
					1344.0		Basal cobble lens, rock flour				
110	SPT	HA-2-110-111.5	4	50/4"	110.0	SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, few fine to coarse gravel, non plastic fines		4.0	17.7	
							Rock flour				1340
115	SPT	HA-2-115-116.5	3	50/3"		SM	Yellowish brown, silty SAND, moist, medium dense, non plastic fines, some fine to medium sand, gravel 5%, sand 63%, fines 32%		3.0	32.0	
						SM	Brown, silty SAND, moist, dense, mostly fine to medium sand, few coarse sand				
						SM	Coarsens with depth, trace non plastic fines Strong brown, silty SAND with gravel, mostly fine to medium sand, some coarse sand, few fine gravel, non plastic fines				1335

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-2 / SB-21-5

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GEOTECHNICAL TEST BORING REPORT

Boring No. HA-2 / SB-21-5
File No. 0132051-005
Sheet No. 4 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
120	SPT	HA-2-120-121.5	5	50/5"		SM	Rock flour Brown, silty SAND with gravel, mostly fine to medium SAND, some coarse sand to fine gravel, non plastic fines		4.3	26.5	
							Rock flour				
							Fines down sequence, non plastic fines				1330
125	SPT	HA-2-125-126.5	3	50/3"		SM	Strong brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, fine gravel, non plastic fines, gravel 15%, sand 57%, fines 28%		5.1	28.0	
							Rock flour				1325
130	SPT	HA-2-130-131.5	5	50/5"		SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, few fine to coarse gravel, non plastic fines, micas		5.0	16.3	
							Rock flour Fines down sequence				
						SM	Brown, silty SAND, moist, medium dense, mostly fine sand, some medium sand, some non plastic fines				1320
135	SPT	HA-2-135-136.5	4	50/4"		SM	Brown, silty SAND, moist, medium dense, mostly fine to medium sand, some coarse sand, non plastic fines, micas, gravel 1%, sand 53%, fines 46%		11.4	46.0	
							Color change to light brown, coarsens down sequence Rock flour				1315
140	SPT	HA-2-140-141.5	5	50/5"		SM	Brown, silty SAND, moist, mostly fine to medium sand, non plastic fines, micas		6.6	25.4	
							Fines down sequence				
						SM	Light brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, little fine to coarse gravel, trace cobble, non plastic fines, micas				1310
145	SPT	HA-2-145-146.5	4	50/4"			Rock flour Brown, silty SAND with gravel, moist, mostly fine to medium sand, some coarse sand, fine gravel, non plastic fines, micas, gravel 13%, sand 69%, fines 18%		4.1	18.0	
							Coarsens down sequence				1305
150					1303.5 150.5	SP	Light yellowish brown, poorly graded SAND with gravel, mostly medium to coarse sand, little fine gravel, little fine sand, few coarse gravel Rig chatter				
							Rock flour				1300
155	SPT	HA-2-155-156.5	2	50/2"	1299.0 155.0	SM	Brown, silty SAND, moist, medium dense, mostly fine sand, some medium sand, few coarse sand, non plastic fines, micas		9.4	30.6	
							Coarsens down sequence				
							Moisture increases, vadose zone				1295
160							Coarsens down sequence, moisture increasing				
					1293.0 161.0 1292.0 162.0	SP-SM SP	Light brown, poorly graded SAND with silt, moist, medium dense, mostly fine to coarse sand, some fine sand, few fine gravel, micas Light yellowish brown, poorly graded SAND with gravel, wet, mostly medium to				1290

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-2 / SB-21-5

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GEOTECHNICAL TEST BORING REPORT

Boring No. HA-2 / SB-21-5
File No. 0132051-005
Sheet No. 5 of 5

Depth (ft)	Sample Type	Sample No.	Recovery (in.)	Sampler Blows per 6 in.	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)	Dry Density (pcf)	Moisture (%)	Fines (%)	Elevation (ft)
165		HA-2-165-166.5			1289.0		coarse sand, little fine sand, little fine gravel, micas				
	SPT		3	50/3"	165.0	SC	Dark brown, clayey SAND, wet, dense, mostly fine to medium sand, some plastic fines, few coarse sand, micas, gravel 1%, sand 67%, fines 32%		10.0	32.0	
					1287.5 166.5	SP	Brown, poorly graded gravelly SAND, wet, mostly medium to coarse sand, little fine gravel, few fine sand, non plastic fines, micas				1285
170					1284.0 170.0	SM	Brown, silty SAND, wet, medium dense, mostly fine to medium sand, few coarse sand, few non plastic fines, micas				
						SM	Brown, silty SAND with gravel, wet, mostly medium to coarse sand, few fine sand, gravel and non plastic fines, mica				1280
175		HA-2-175-176.5			1279.0 175.0		BOTTOM OF EXPLORATION 175.0 FT				
	SPT		3	50/3"					11.0	18.1	
							Note: Groundwater at 163.0 ft.				1275
180											
											1270
185											
											1265
190											
											1260
195											
											1255
200											
											1250
205											

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. HA-2 / SB-21-5

H&A BORING MDH SAMPLE 132051_PLOG-HA-LIB09.GLB PLOG-H&A.GDT \\HALEYALDRICH.COM\SHARE\CF\PROJECTS\0132051\-005 AREA Q PHASE II GEOTECH\FIELD_INVESTIGATION\GINT\132051-000-TB.GPJ Aug 12, 21

APPENDIX H

CEQA Noise Memorandum
(Sespe Consulting, Inc. – 2023)

SESPE CONSULTING, INC.

374 Poli Street, Suite 200 • Ventura, California 93003
Office (805) 275-1515 • Fax (805) 667-8104

MEMORANDUM

Date: April 17, 2023

To: Jim Gore – Vulcan Materials Company

From: Graham Stephens – Sespe Consulting, Inc.

Cc: Mark Harrison, Esq.; Adam Guernsey, Esq.; and, Russell Frink – Harrison, Temblador, Hungerford and Guernsey
John Hecht, P.E.; Brian Anderson, P.G.; and, Maya Rohr – Sespe Consulting, Inc.

Re: CEQA Noise Memorandum for the Cajon Creek Quarry Consolidation Project
Vulcan Materials Company – Western Division

Vulcan Materials Company – Western Division ("Vulcan") operates two separate and adjacent aggregate surface mining and processing operations in the City and County of San Bernardino. The existing Cajon Creek Quarry is located in the City of San Bernardino ("City"), while the existing Area Q Quarry is located in the County of San Bernardino ("County"). The Cajon Creek Quarry was initially approved by the City in 1993 as part of the CalMat Cajon Creek Specific Plan (SP No. 90-01, et al.), and analyzed within an Environmental Impact Report (EIR) published in the same year (the "1993 EIR"). In 2020, the County approved a zone change, use permit, and reclamation plan for mineral extraction in the area immediately south of the Cajon Creek Quarry known as the "Area Q" Quarry, which was evaluated within a separate EIR certified by the County in 2020 (the "2020 EIR").

In order to increase the operational efficiency of these existing mining operations, Vulcan is proposing to combine the Cajon Creek (comprised of operational Areas K, L, M, and N) and Area Q quarries into one quarry under one Surface Mining and Reclamation Act (SMARA) Reclamation Plan. For this reason, the project is called the "Cajon Creek Consolidation Project" (hereinafter the "Project"). As part of consolidating the operations under a single Reclamation Plan, Vulcan proposes the following changes:

1. Mining in Area K, previously designated for light industrial use, to a depth of 240-feet below ground surface (bgs).
2. Mining in Areas L, M, and Q to a target depth of 240-feet bgs, an increase from the previously permitted 120-feet bgs.
3. Mining in the northern portion of Area N, currently designated for mineral processing, to a depth of 120-feet bgs; followed by mineral processing in Area N, as Area M is mined to a final depth of 240-foot bgs.
4. Mining the resources located between Areas K, L, and Q in one mining area, and M and N in another, creating two consolidated mining pits for efficient mineral resource recovery.

No other operational changes are proposed as part of the Project. Specifically, the pace, nature, equipment used, and traffic generation/routes would not change from what was previously evaluated in the 1993 and 2020 EIRs. See Figures 1 and 2 attached which show the Project site, and the operational areas (i.e., Areas K, L, M, N, and Q) described above.

In accordance with the California Environmental Quality Act (CEQA), this memorandum has been prepared to identify whether there would be new significant impacts or an increase in the severity of a previously identified environmental effects related to noise or vibration as a result of the Project, when compared to the findings identified in the previous 1993 and 2020 EIRs.

PREVIOUS CEQA EVALUATIONS & CONCLUSIONS

1993 EIR (Cajon Creek Quarry)

The 1993 EIR included an evaluation of noise-related impacts associated with the Specific Plan. The 1993 EIR relied on findings from an acoustical analysis conducted by Giroux & Associates in May 1991 (Giroux & Associates, 1991). Potential impacts identified included noise generated by mineral resources processing in planning Areas D, I, and N. With respect to mineral extractive activities, the 1993 EIR also found that noise within extractive areas would generally be shielded by the walls of the quarry itself, as well as perimeter berms and stockpiles (where feasible). Additionally, no onsite blasting would occur. For these reasons, the 1993 EIR found that there would not be any significant impacts to sensitive receptors as a result of onsite mining. Lastly, no significant impacts were anticipated from mobile sources because the background traffic noise from nearby Interstate 215 (I-215) and Cajon Boulevard, together with the minimum setbacks provided in the Specific Plan, eliminate the possibility of significant impacts (City of San Bernardino, 1993).

As noted in the 1993 EIR, at the time of the analysis the areas of most concern for offsite noise impacts were associated with the proposed aggregate processing facilities, specifically potential impacts to those residential areas located south of planning Area N. Because of the potential that noise resulting from processing operations could exceed the City's applicable standards at nearby homes, the 1993 EIR included a mitigation measure limiting operational noise levels. Conditional Use Permit (CUP) 91-31 also includes a similar Conditions of Approval (COA) to achieve noise reduction related to the proposed aggregate processing facilities in planning Area N.

Specifically, the following mitigation measures were included as part of the 1993 EIR:

- *Plant operations, including aggregate extraction, processing, handling and formulation of any construction materials, shall not cause hourly noise levels to exceed any of the following noise levels at the nearest occupied residence to the processing plant:*
    - *65 dB L_{eq} from 7:00 a.m. to 7:00 p.m.;*
    - *60 dB L_{eq} from 7:00 p.m. to 10:00 p.m.; and*
    - *55 dB L_{eq} from 10:00 p.m. to 7:00 a.m.*
- *Plant site layout and design shall be located in such a manner as to minimize impacts to residences to the southwest of Planning Area N, behind the Southern Pacific Railroad embankment.*

In addition to the 1993 EIR mitigations summarized above, the following noise reduction measures were included as COAs for CUP 91-31:

- ***COA #27:*** *Extraction activities and aggregate processing may occur anytime between 6:00 a.m. and 10:00 p.m., Monday through Saturday; however, extraction activities shall not exceed a total of 12 hours per day. An allowable exception to these hours would be operations in response to an emergency to protect*

life or property, or in response to the requirements of government or government agencies beyond the control of the operator.

Maintenance activities may be conducted at any time.

- ***COA #28:*** *No mining or processing operations shall be conducted on Sundays or holidays, although maintenance activities may occur at any time (see previous Condition).*
- ***COA #29:*** *At no time shall there be any blasting, dynamiting or use of explosives of any kind whatsoever on the premises.*

In analyzing the future impact of noise levels from planning Area N on nearby land uses, the 1993 EIR determined that the railroad embankment adjacent to planning Area N, coupled with the noise attenuation measures above, would sufficiently mitigate adverse noise-related impacts to nearby sensitive land uses.

2020 EIR (Area Q Quarry)

The 2020 EIR also included an evaluation of potential noise and vibration impacts associated with the Area Q Quarry. The 2020 EIR relied on findings from the Noise Impact Assessment prepared by Sespe Consulting, Inc. in 2020 (Sespe Consulting, 2020). The following design features were incorporated into the Area Q project to limit potential noise impacts, and therefore these design features were also evaluated as part of the 2020 EIR:

- *Prior to any mining activities and/or significant materials excavation, an approximately 10-foot high vegetated earthen berm would be built along the entire length of the Project site's* (i.e., Area Q's) *southern boundary with sufficient length to break line-of-sight between adjacent residential receptors located in Muscoy and proposed mining areas.*
- *The approximately 10-foot high berm would serve as the primary storage location for topsoil and subsoil removed from the Area Q Quarry site. Please see Figure 2-4 in Section 2.0 – Project Description* (within the 2020 EIR) *which shows the location of the proposed perimeter berm.*
- *There would be no off-site on-road haul truck trip leaving or entering the Project site from public roads.*
- *No excavation of material or overburden would take place within twenty-five (25) to fifty (50) feet from the public right-of-way or other property lines.*
- *Blasting would not be used for the proposed mining operations.*

The 2020 EIR evaluated potentially significant impacts associated with construction (removal of topsoil/subsoil and construction of the southern perimeter berm) and operations (mining/extraction of aggregate) activities proposed within the Area Q Quarry. The 2020 EIR found that there were no potentially significant impacts associated with vibration or proximity to airport land uses.

With respect to potentially significant increases in ambient noise, the 10-foot-high berm was determined to adequately shield nearby sensitive land uses from any increase in ambient noise associated with onsite mining. However, the analysis found that before the berm was constructed, there would not be a physical barrier to attenuate noise impacts associated with topsoil/subsoil removal and berm construction, which was anticipated to last for a period of up to three months. As a result of these potential temporary impacts, the 2020 EIR included the following mitigation measure designed to limit impacts to nearby sensitive land uses associated with berm construction and topsoil removal:

- ***Mitigation Measure NO-1:*** *Topsoil/subsoil removal and berm construction activities shall only occur between the hours of 7:00 a.m. and 7:00 p.m., Monday through Saturday as defined by Section 83.01.080(g)(3)-Exempt Noise of the San Bernardino County Code of Ordinances.*

Upon application of the mitigation measure above, the 2020 EIR determined that the Area Q Quarry would not have a significant impact related to noise.

PROPOSED PROJECT CEQA EVALUATION

Project Noise Summary

The potential incremental difference in noise and vibration impacts resulting from the proposed Project, specifically as compared to what was determined and disclosed in the 1993 and 2020 EIRs, was considered. As summarized above, the only operational changes that would result from the Project would be mining in Area K and Area N, deeper mining in Areas L, M, and K, and mining between Areas M and N and Areas K, L, and Q, respectively. Processing operations would also be relocated from Area M to Area N, but only at such time that Area N had been mined to a target depth of 120-feet bgs (i.e., the processing plant would operate at the bottom of the pit). See Figure 2 attached which shows the final design and slope contours of the consolidated excavation pits and the individual planning areas.

Additionally, the Project site currently has existing perimeter berms to control offsite noise. Specifically, 10- to 12-foot-high earthen perimeter berms have been installed along the entirety of the site's southern boundary (adjacent to Devil Creek Diversion Channel and the community of Muscoy) and eastern boundary (adjacent to Cajon Boulevard). These existing perimeter berms, which provide significant noise attenuation at receptors located to the east and south of the Project, would remain and be maintained throughout the life of the proposed Project. Note, the southern perimeter berm was estimated to provide approximately -16 decibels of reduction within the 2020 EIR. This level of attenuation was also confirmed during site visits conducted by Sespe in October 2022 (see discussion below). See attached Figure 1 and Figure 3 which show the location as well as photos of the existing perimeter berms.

Regarding mineral extraction and the use of mobile equipment, because there would be no change in the pace, nature, and equipment/vehicles used, onsite excavation activities are not expected to generate additional noise impacts. While mining within Area K would be a new activity, mining in this area would occur behind the existing perimeter berm which would sufficiently attenuate noise. Additionally, the only receptors to the east and north of the site are industrial warehouses, located near the existing railroad track. Note that existing train activity represents a significant and sustained source of background noise in the region. Additionally, both the City and County allow for higher noise levels at industrial receptors such as the warehouses, when compared to more sensitive receptors like residences. Furthermore, excavation at deeper depths would also decrease potential noise impacts over the life of the Project. Over time, as the excavation pit proceeds from the current depth of 120-feet bgs to the final depth of 240-feet bgs, equipment noise would be increasingly shielded due to the attenuation provided by the deepening pit walls.

Noise conditions related to onsite processing operations would also not change as a result of the Project. Specifically, processing would occur within Areas M and N, and the plant would operate within the bottom of the pits at a depth of 120-feet bgs to 240-feet bgs. As with noise from mobile equipment, the existing pit walls, which

would only deepen over time, would continue to sufficiently attenuate onsite processing noise at offsite locations, including at residences within the community of Muscoy to the south.

Lastly, consistent with the existing operations, no onsite blasting would occur during Project operations. As such, there would continue to be no vibration impacts as a result of the Project. For these reasons, the proposed Project would not create new or more sever noise or vibration impacts at nearby receptors compared to what was evaluated in the 1993 and 2020 EIRs. Conversely, due to the fact that mining and processing activities would occur at deeper depths, the Project is expected to improve noise conditions over time as the excavation deepens as the pit walls would provide further attenuation. Furthermore, onsite noise measurements were collected in October 2022, which show that the noise levels generated by both the current Cajon Creek and Area Q quarries comply with applicable standards and ordinances promulgated by the City and County. See the discussion below, as well as the measurement data attached for additional detail.

2022 Noise Monitoring & Compliance Summary

To reconfirm onsite noise conditions, Sespe collected additional 24-hour noise measurements at the Project site in October 2022. Noise measurements were also collected as part of the 1993 and 2020 EIRs, and therefore the 2022 measurement locations were chosen to generally mirror those previously evaluated. Note that apart from Vulcan's existing mining and processing operations, there are many unrelated sources of background noise, primarily passing trains as well as industrial activities and truck noise associated with the warehouses that surround the site to the north and east. In an attempt to quantify the extent to which Vulcan's existing operations contribute to the noise environment, noise levels measured during the daytime (7:00 a.m. – 10:00 p.m.) were compared to noise levels measured during the nighttime (10:00 p.m. – 7:00 a.m.) hours, as the facility was not operational during the night. Consistent with the existing City and County approvals summarized above, aggregate extraction and processing activities may only occur between 6:00 a.m. and 10:00 p.m., and therefore the measured nighttime noise levels provide a useful control by which daytime operational noise levels can be compared. Table 1 below summarizes the daytime and nighttime noise levels measured at the six locations shown on Figure 1.

Table 1 – 2022 Noise Measurement Summary

Measurement / Location No.	Dates Measured	Measured Noise Levels – Average L_{eq}		
		Daytime (7:00 a.m. – 10:00 p.m.)	Nighttime (10:00 p.m. – 7:00 a.m.)	Comparison (Daytime vs. Nighttime)
Location #1	10/11/2022 – 10/12/2022	47.6	47.8	-0.3
Location #2	10/11/2022 – 10/12/2022	55.6	58.3	-2.7
Location #3	10/12/2022 – 10/13/2022	49.9	51.0	-1.1
Location #4	10/12/2022 – 10/13/2022	52.4	53.4	-0.9
Location #5	10/13/2022 – 10/14/2022	55.0	54.6	0.4

Measurement / Location No.	Dates Measured	Measured Noise Levels – Average L_{eq}		
		Daytime (7:00 a.m. – 10:00 p.m.)	Nighttime (10:00 p.m. – 7:00 a.m.)	Comparison (Daytime vs. Nighttime)
Location #6	10/13/2022 – 10/14/2022	54.6	55.6	-1.0

See Figure 1 and the noise measurement summaries in Attachment B for additional detail.

As shown in the table above, based upon the daytime/nighttime comparison, on average Vulcan's existing operations did not appear to increase noise levels within the Project vicinity by any measurable amount. These current noise conditions are only expected to improve over the life of the Project as the pit walls deepen. Furthermore, for security reasons, many of the measurements were collected within the quarry boundaries, on the inside of the perimeter berms. Therefore, Project noise levels at receptors located beyond the perimeter berms, such as the industrial facilities to the east and Muscoy residences to the south, are expected to be far less than those measured here (per the 2020 EIR, the perimeter berms are estimated to reduce operational noise levels by approximately -16 decibels). See the attached measurement data logs and daytime/nighttime summaries for additional detail.

CONCLUSIONS

As discussed above, Vulcan proposes to continue operations consistent with the projects previously analyzed in the 1993 and 2020 EIRs, with the changes identified above. As demonstrated above, the proposed Project would not result in any new significant environmental impacts or more severe environmental impacts related to noise compared to what was analyzed in those previous EIRs. Conversely, as excavation would occur at deeper depths compared to what was analyzed previously, potential noise impacts are expected to be less under the proposed Project compared to what was disclosed in the 1993 and 2020 EIRs.

Additionally, since certification of the 1993 EIR and 2020 EIR, development in the vicinity of the Project site has not created the potential for an increase in noise impacts from previously analyzed operations. The distance to the nearest sensitive residential land uses has not changed. The closest homes in 1993 and 2020 (the homes located in the nearby community of Muscoy) continue to be the closest homes to the site today, and no new residential neighborhoods have been developed in the area.

Lastly, since 1993 and 2020, there have been no changes to the standards of significance provided in CEQA Appendix G Environmental Checklist regarding analysis of noise or vibration, nor material changes to the City or County noise ordinances and standards. Therefore, based on review of the Project and the analysis summarized above, no new or greater significant noise or vibration impacts would result when compared to those addressed in the 1993 EIR and 2020 EIR.

ATTACHMENTS

A. Figures
B. Noise Measurement Summary & Data Logs

ATTACHMENT A

Figures



Source: Google Earth™ (2022)

- Project Boundary (approx.)
- Existing Perimeter Berms (10- to 12-feet high)
- 24-Hour Noise Monitoring Location(s)

N

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FIGURE 1

PROJECT NOISE OVERVIEW
Cajon Creek Consolidated Quarry
Vulcan Materials Company
San Bernardino County, California

PROJECT #:	210509.0336	DATE:	3/29/23
SCALE:	See Above	DRAWN BY:	ML / GPS



INDEX MAP

GEOLOGIC DESCRIPTION:

THE GEOLOGIC DESCRIPTION IS BASED ON THE FOLLOWING TECHNICAL REPORTS AND HAS NOT BEEN VERIFIED IN THE FIELD BY THE UNDERSIGNED

- DANSKIN, W., MCPHERSON, K., & WOOLFENDEN, L. (2006). *HYDROLOGY, DESCRIPTION OF COMPUTER MODELS, AND EVALUATION OF SELECTED WATER-MANAGEMENT ALTERNATIVES IN THE SAN BERNARDINO AREA, CALIFORNIA*. U.S. GEOLOGICAL SURVEY. U.S. GEOLOGICAL SURVEY.
- DUTCHER, L., & GARRETT, A. (1963). GEOLOGIC AND HYDROLOGIC FEATURES OF THE SAN BERNARDINO AREA, CALIFORNIA. WASHINGTON, D.C.: US GOVERNMENT PRINTING OFFICE.
- HALEY & ALDRICH, INC. (APRIL 2020). *ADDENDUM TO GEOTECHNICAL EVALUATION REPORT*. WALNUT CREEK, CA: HALEY & ALDRICH, INC.
- MILLER, F., & MATTI, J. (2001). GEOLOGIC MAP OF THE SAN BERNARDINO NORTH 7.5' QUADRANGLE, SAN BERNARDINO COUNTY , CALIFORNIA. *OPEN-FILE REPORT 01-131*. MENLO PARK, CA, SAN BERNARDINO: U.S. GEOLOGICAL SURVEY. RETRIEVED FROM HTTPS://PUBS.USGS.GOV/OF/2001/0131/.

GEOLOGIC SETTING

THE SITE IS LOCATED WITHIN THE PENINSULAR RANGES PHYSIOGRAPHIC PROVINCE, WHICH CONSISTS OF A SERIES OF MOUNTAINS RANGES DOMINATED BY MESOZOIC GRANITIC AND OLDER METAMORPHIC ROCKS SEPARATED BY VALLEY BASINS FORMED BY SAN ANDREAS-RELATED FAULTS AND OTHER FAULT SEGMENTS. THE SITE IS SITUATED WITHIN THE SAN BERNADINO BASIN, AN ALLUVIAL LOWLAND FILLED WITH SEDIMENT DERIVED FROM SURROUNDING HIGHLANDS THAT IS BOUND BY THE SAN ANDREAS FAULT ZONE TO THE NORTH AND THE SAN JACINTO FAULT TO THE SOUTHWEST. THE SAN BERNADINO BASIN REPRESENTS A PULL-APART BASIN THAT FORMED IN RESPONSE TO A RIGHT STEP DISPLACEMENT BETWEEN THE SAN JACINTO AND SAN ANDREAS FAULTS (HALEY & ALDRICH, 2020).

REGIONAL GEOLOGY

THE SITE IS SITUATED SOUTH OF THE EASTERN EXTENT OF THE SAN GABRIEL MOUNTAINS, A PROMINENT PHYSIOGRAPHIC FEATURE ALONG THE NORTHERN EDGE OF THE LOS ANGELES METROPOLITAN AREA AND PORTIONS OF THE INLAND EMPIRE. THE REGIONAL GEOLOGY CONSISTS OF SEDIMENTARY BASIN INFILL CHARACTERIZED AS UNCONSOLIDATED RIVER CHANNEL DEPOSITS AND HOLOCENE AND PLEISTOCENE ALLUVIUM (DANSKIN, ET AL., 2006). THE EASTERN REGION IS CHARACTERIZED BY YOUNGER ALLUVIUM AND QUATERNARY AND TERTIARY INDURATED SEDIMENTARY STRATA OUTCROPPING ALONG LOW-RELIEF HILLSIDES. A BASEMENT COMPLEX OF PRECAMBRIAN TO TERTIARY IGNEOUS AND METAMORPHIC ROCKS THAT UNDERLIES THE BASIN INFILL CROPS OUT IN THE SURROUNDING MOUNTAIN RANGES (DUTCHER & GARRETT, 1963). REGIONALLY, THE AREA IS CONSIDERED SEISMICALLY ACTIVE, WITH MANY FAULTS DESIGNATED AS BEING IN ALQUIST-PRIOLO (AP) SPECIAL STUDY ZONES. THE REGIONAL STRUCTURAL GEOLOGY IS CHARACTERIZED BY THE CUCAMONGA THRUST FAULT AND THE SAN ANDREAS FAULT, WHICH BOUND THE SAN GABRIEL MOUNTAINS TO THE SOUTH AND NORTHEAST, RESPECTIVELY. THE SAN JACINTO FAULT TRENDS BETWEEN THE CUCAMONGA THRUST FAULT AND THE SAN ANDREAS FAULT THROUGH LYTLE AND GLEN HELEN WASHES AND CANYONS.

SITE GEOLOGY

THE GEOLOGY OF THE SITE IS CHARACTERIZED AS BRAIDED, ALLUVIAL LITHOFACIES THAT FORM WITHIN MEDIAL TO DISTAL FAN COMPLEXES. BASED ON THE USGS GEOLOGIC MAP OF THE SAN BERNADINO NORTH 7.5-MINUTE QUADRANGLE, SAN BERNADINO COUNTY, CALIFORNIA (MILLER & MATTI, 2001), THREE DISTINCT ALLUVIAL LITHOFACIES ARE MAPPED AT THE SITE. THE NORTHEASTERN PORTION OF THE SITE IS CHARACTERIZED BY LATE HOLOCENE SAND AND GRAVEL DEPOSITS DISTINGUISHED AS UPPER-TERRACE LEVEL SEDIMENTARY DEPOSITS. THE LITHOFACIES OCCURRING IN THE CENTRAL SECTION OF THE SITE, AS WELL AS THE NORTHEASTERN PORTION, IS SLIGHTLY CONSOLIDATED TO CEMENTED HOLOCENE AND LATE PLEISTOCENE SILT, SAND, AND PEBBLE DEPOSITS. IN THE SOUTHWEST CORNER OF AREA Q, LATE HOLOCENE, LOWER TERRACE DEPOSITS OCCUR THAT CONSIST OF SAND AND GRAVEL WITH SPARSE PEBBLE TO BOULDER SIZE CLASTS. THESE DEPOSITS ARE TYPICALLY THIN (< 10 FT THICK) AND LATERALLY DISCONTINUOUS DUE TO LOCALIZED EROSION AND SCOURING. REGARDING STRUCTURAL GEOLOGY, THERE ARE THREE MAJOR FAULTS NEAR THE SITE: THE GLEN HELEN FAULT STRAND OF THE SAN JACINTO FAULT, THE CUCAMONGA THRUST FAULT, AND THE SAN ANDREAS FAULT (HALEY & ALDRICH, 2020). A PORTION OF THE GLEN HELEN FAULT STRAND, LIKELY THE MOST ACTIVE FAULT OF THE SAN JACINTO FAULT, IS MAPPED AS A 'CONCEALED' FAULT TRENDING THROUGH THE SOUTHWEST PORTION OF AREA Q. THIS FAULT SEGMENT IS LISTED AS A STATE OF CALIFORNIA AP EARTHQUAKE FAULT ZONE.

GENERAL NOTES:

TERMINATION DATES

MINING:	2088
RECLAMATION:	2090
MONITORING:	2093

DESIGN INFORMATION

MINING DEPTH:	240 FEET BELOW GROUND SURFACE (BGS)
SLOPES:	2H:1V (HORIZONTAL TO VERTICAL)

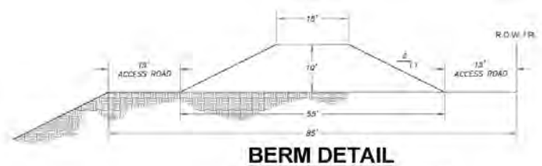
STRUCTURES

ADJACENT AREA:	NO OFF-SITE ADJACENT STRUCTURES WITHIN 200 FEET OF SITE BOUNDARIES
PROJECT AREA:	EXISTING AND PROPOSED STRUCTURES ARE IDENTIFIED ON SHEET 6, AND INCLUDE (BUT ARE NOT LIMITED TO): AGGREGATE PROCESSING PLANT, HOT MIX ASPHALT PLANT, RECYCLE PLANT, CONVEYORS, ANCILLARY SUPPORT FACILITIES. NO PERMANENT STRUCTURES PROPOSED, ALL STRUCTURES ARE TEMPORARY AND WILL BE REMOVED DURING RECLAMATION.

NO SIGNAGE PROPOSED.

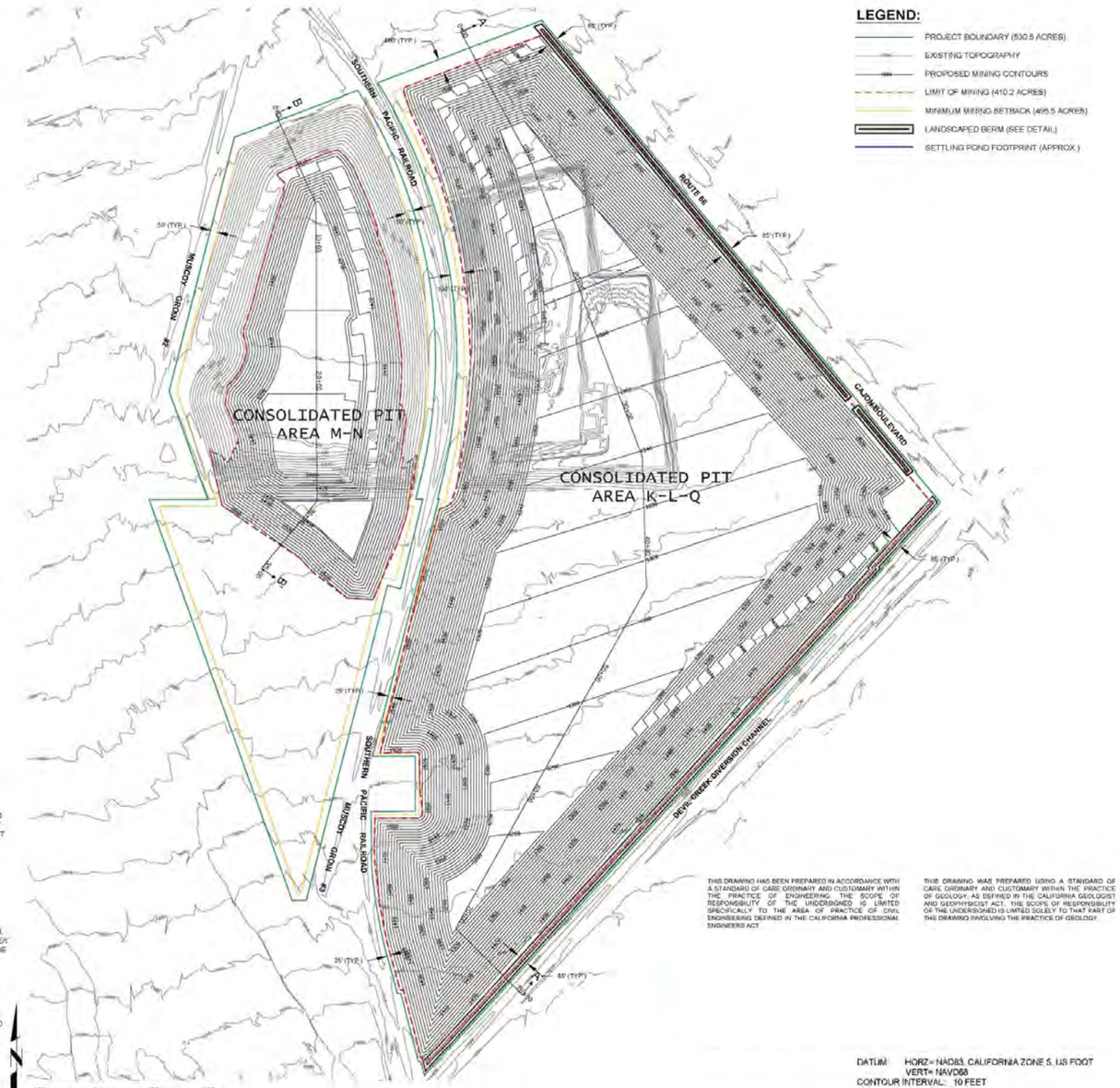
MINING NOTES:

1. MINING MAY BE CONDUCTED IN MULTIPLE AREAS THROUGHOUT THE SITE AT ONE TIME TO ALLOW THE OPERATOR TO BLEND MATERIALS FROM MULTIPLE AREAS TO MEET PRODUCT SPECIFICATIONS. THEREFORE, MINING IN THE VARIOUS EXTRACTION AREAS THROUGHOUT THE SITE IS CONSIDERED A SINGLE PHASE.
2. MOST OF THE TOPSOIL AND SUBSOIL HAVE ALREADY BEEN REMOVED FROM THE MINING AREAS. THIS MATERIAL WILL BE STORED IN PERIMETER BERMS IN AREA K AND Q, AS SHOWN. ANY ADDITIONAL MATERIAL RECOVERED DURING OPERATIONS WILL BE STORED FOR USE IN RECLAMATION.
3. MINING SETBACKS WILL BE MAINTAINED AS SHOWN HEREON.
4. THE OPERATOR WILL COMPLY WITH THE CONCLUSIONS PRESENTED BY HALEY & ALDRICH, INC. IN THE *GEOTECHNICAL EVALUATION FOR VULCAN MATERIALS COMPANY CAJON CREEK CONSOLIDATION PROJECT* (REPORT DATE: OCTOBER 10, 2022). FINAL PIT SLOPES SHALL BE INCLINED NO STEEPER THAN 2H:1V.
5. BEST MANAGEMENT PRACTICES (BMPs) TO PREVENT EROSION, SEDIMENT, AND WINDBLOWN DUST WILL BE IMPLEMENTED AS DESCRIBED IN THE SITE-SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP).
6. APPROXIMATE ANTICIPATED LOCATION OF FINES SETTLING BASINS ARE SHOWN HEREON FOR ILLUSTRATIVE PURPOSES AND ARE SUBJECT TO CHANGE IN VOLUME, LOCATION, AND FOOTPRINT BASED ON OPERATIONAL NEEDS OVER THE LIFE OF THE MINE.



BERM DETAIL

N.T.S.
DETAIL FOR PERIMETER BERM IN AREA K AND Q



THIS DRAWING HAS BEEN PREPARED IN ACCORDANCE WITH A STANDARD OF CARE ORDINARY AND CUSTOMARY WITHIN THE PRACTICE OF ENGINEERING. THE SCOPE OF RESPONSIBILITY OF THE UNDERSIGNED IS LIMITED SPECIFICALLY TO THE AREA OF PRACTICE OF CIVIL ENGINEERING DEFINED IN THE CALIFORNIA PROFESSIONAL ENGINEERS ACT.

THIS DRAWING WAS PREPARED USING A STANDARD OF CARE ORDINARY AND CUSTOMARY WITHIN THE PRACTICE OF GEOLOGY, AS DEFINED IN THE CALIFORNIA GEOLOGIST AND GEOPHYSICIST ACT. THE SCOPE OF RESPONSIBILITY OF THE UNDERSIGNED IS LIMITED SOLELY TO THAT PART OF THE DRAWING INVOLVING THE PRACTICE OF GEOLOGY.

DATUM: HORZ= NAD83, CALIFORNIA ZONE 5, US FOOT
VERT= NAVD88
CONTOUR INTERVAL: 10 FEET
SOURCES: SEE SHEET 1

OWNER / APPLICANT	VULCAN MATERIALS COMPANY – WESTERN DIVISION 31 RANCHO CAMINO DRIVE, SUITE 300 POMONA, CALIFORNIA 91766
LAND USE CONSULTANT	SESPE CONSULTING, INC.

REVISIONS

VULCAN MATERIALS COMPANY
CAJON CREEK CONSOLIDATED QUARRY

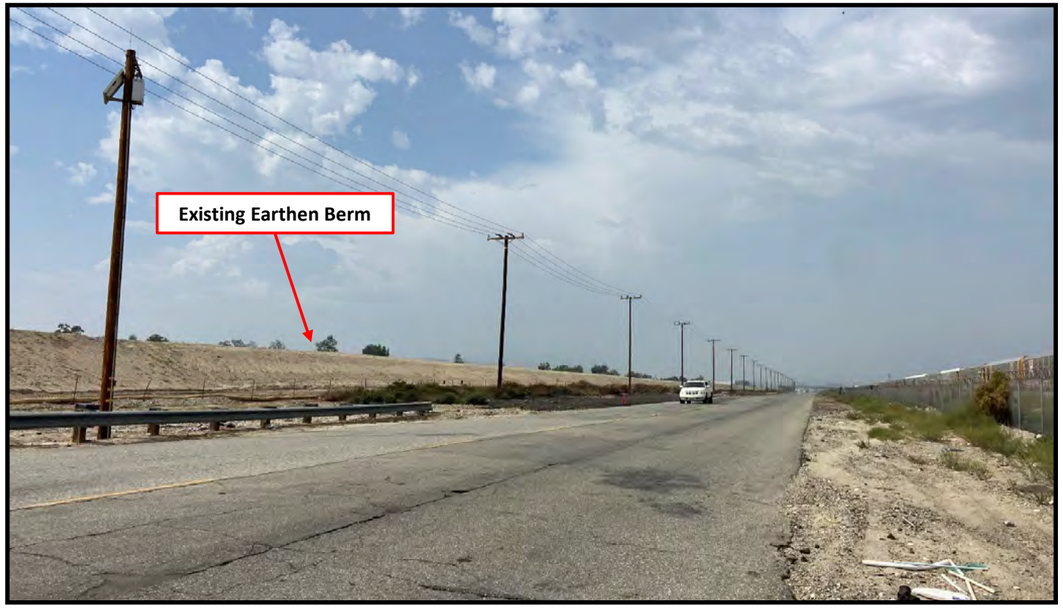
MINING PLAN

Source: Sespe Consulting, Inc. (2023)

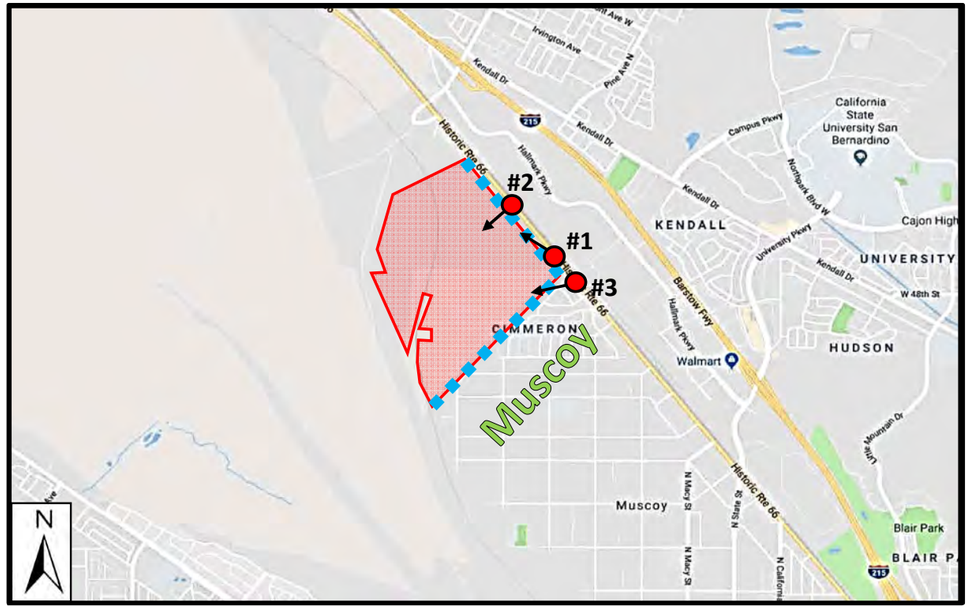
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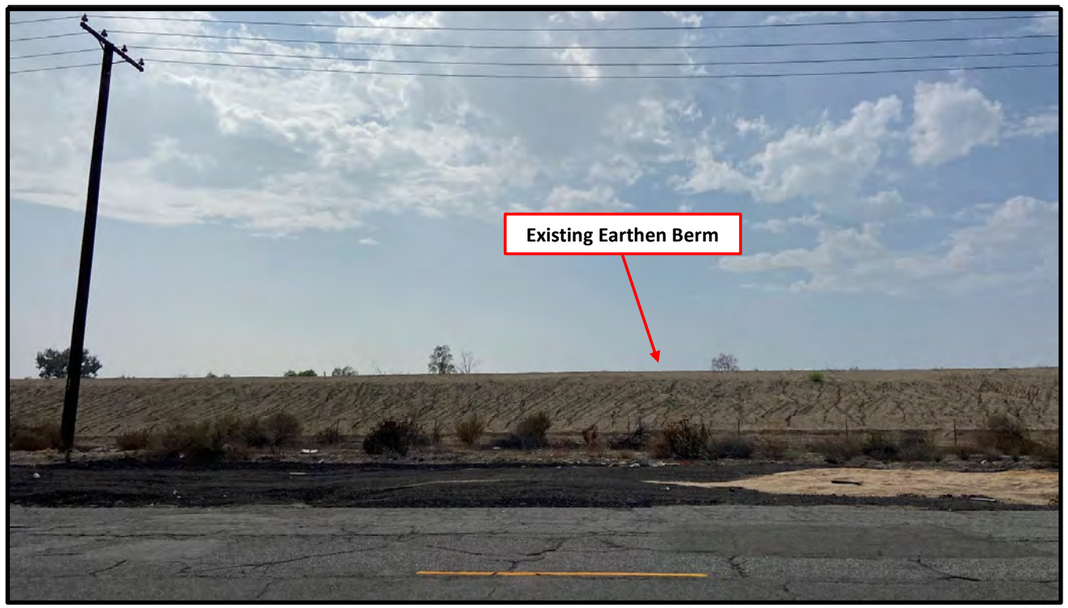
SESPE CONSULTING, INC.
A Trinity Consultants Company

FIGURE 2	PROJECT SITE PLAN / DESIGN Cajon Creek Consolidated Quarry Vulcan Materials Company San Bernardino County, California		
PROJECT #:	210509.0336	DATE:	3/29/23
SCALE:	See Above	DRAWN BY:	ML / GPS



Photograph #1 (Cajon Boulevard)





Photograph #2 (Cajon Boulevard)



Photograph #3 (Cajon Boulevard / Devil Creek Diversion Channel)

Photo Date(s): 10/13/2022

EXISTING PERIMETER BERMS PHOTOS

Photo 1: Photo of the existing berm which extends along the entire eastern perimeter of the Project site. Photo taken from Area K/L entrance looking northwest from Cajon Boulevard.
Photo 2: Photo of the existing berm which extends along the entire eastern perimeter of the Project site. Photo is looking west toward the site from Cajon Boulevard.
Photo 3: Photo of the existing berm which extends along the entire southern perimeter of the Project site/Area Q. Photo is looking northwest where Cajon Boulevard crosses the concrete channel.

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FIGURE	PERIMETER BERM PHOTOS		
3	Cajon Creek Consolidated Quarry Vulcan Materials Company San Bernardino County, California		
PROJECT #:	210509.0336	DATE:	3/29/23
SCALE:	See Above	DRAWN BY:	ML / GPS

ATTACHMENT B

Noise Measurement Summary & Data Logs

The noise measurement summary and data logs are available using the following link:
https://files.trinityconsultants.com/message/M255T2DgBVF3YcVVkO1A4e